

CENTER FOR MIND-BODY MEDICINE  
COMPREHENSIVE CANCER CARE 2000

CONCURRENT: Antioxidants with Radiation and Chemotherapy

PRESENTERS: Charles Simone, MD; Ralph Moss, MD; Rudolph Salganik, MD

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P R O C E E D I N G S

DR. DREHER: I think this is a wonderful attendance here. I was searching for one of our panel members who's around and will be here. I think we have a really provocative topic today. It seems to be one of the hot button issues in complimentary cancer medicine.

My name is Henry Dreher. I'm a medical writer specializing in complementary medicine and cancer. I also counsel cancer patients, and this question of should I or should I not take antioxidants when I'm doing conventional cancer treatments is one of the most persistent and common questions that I get.

It is in some ways quite troubling because the idea that one could be doing complimentary treatments and taking antioxidants and having it interfere with the conventional treatments that are designed to save their lives is a very complex question.

What we're going to have today is a number of different points of view on what the evidence really does suggest about this. What can we glean from the evidence? How good is that evidence? How reliable is it?

A lot of the studies are "pre-clinical" studies, meaning they are laboratory in vitro studies, or in vitro animal studies. But there are some human studies and I think we'll hear about the human studies today that begin to answer; I don't think they provide definitive answers, although some may disagree here, but they at least begin to answer the question of whether taking antioxidants is a problem.

And of course, it's very complex, again, because it may be fine to take some, not fine to take others. Dosages are an issue.

One thing I want to say before we start, one short comment, is it might seem solid prudence to tell patients, as most mainstream oncologists will do, just don't take your antioxidants; we don't know enough yet and it may harm your conventional treatment.

I think that's a wholly inadequate answer and I think the reason for it is that such physicians don't put themselves in the shoes of patients who are looking for every possible edge.

If there's data suggesting that taking antioxidants with chemotherapy radiation may not only not harm, but may in fact act in a synergistic manner to improve outcome, the patients owe it to themselves and their families to fully investigate this question and not to try to put their heads in the sand.

So, I think that's where we are now and we have some wonderful speakers today who will address these questions in great scientific detail. We're going to start with Dr. Ralph Moss, and then we'll go to Dr. Rudolph Salganik from the University of North Carolina. We'll move onto Dr. Charles Simone, and then we'll complete the discussion with a comment by Dr. David Rosenthal.

Ralph Moss is an internationally known medical writer who has written 11 books and 3 film documentaries, mostly on the question of cancer research and treatment. Former assistant director of public affairs at Memorial Sloan Kettering Cancer Center in New York, Moss has for more than 25 years independently evaluated the claims of various cancer treatments, conventional and nonconventional.

He currently directs the Moss Reports, which are detailed written reports on over 175 varieties of cancer diagnoses. He also directs CancerDecisions.com and RalphMoss.com Web resources for cancer patients. So, it's very much my great pleasure to introduce one of the pioneers in the field of complimentary cancer medicine, Dr. Ralph Moss.

DR. MOSS: Thank you very much. I've recently written a book on the topic of antioxidants against cancer and there are a couple of copies at my booth downstairs, the Moss Reports booth, so if any of you, after the talk, want to look at this, please feel free to come by and take a look. I think also it's for sale in the bookstore here.

The topic of antioxidants and cancer, specifically, antioxidants and chemotherapy, is an extremely emotional one, and I don't claim to be able to understand all of the reasons for the emotions around the topic.

But it seems to me that it has something to do with Michael Lerner's last talk in the sense that there are different cultures within medicine and within society. And the use of antioxidants or foods that are rich in antioxidants represents one end of the spectrum, and the use of chemotherapy or radiotherapy or other toxic and destructive, cytotoxic methods, represents the other end of the spectrum.

Often times, when people get cancer they find themselves in kind of a cognitive dissonance, because many of us probably have been using antioxidants in our daily life in an attempt to avoid illness, or at least eating a diet that's rich in antioxidants. I know I myself have been sort of hooked on this philosophy since the days of Dale Davis back in the 1960s.

So, for me it's sort of like Mom and apple pie. It's very much part of my whole thinking and my upbringing and not at all something foreign to my way of living.

But when you get cancer, you're thrown into another culture, which is the culture of cytotoxic treatments, the destruction of killing cells, and you're under the care of doctors who are not necessarily from that same sort of holistic mind set.

Lately, I've been hearing of patients coming to my report service telling me that not only are their doctors discouraging them from using antioxidants, but there are signs going up in the offices of oncologists that state do not take antioxidants along with your chemotherapy. It sort of adds insult to injury.

Not only are you then deprived of something that seems like a life-giving and health-promoting practice, but the message is delivered to you in a particularly insensitive way.

When patients ask about this topic, I have heard that doctors sometimes respond in a kind of crude way of argument from authority, that basically, I'm the doctor; I'm the oncologist, and you just shouldn't do it, without much substantiation for the claim that it's in any way harmful.

So, I would like to review with you today in a very short time, just about 15 minutes, some of the evidence on which I base my conclusion that taking antioxidants during chemotherapy, or radiotherapy, is probably a safe practice, that the preponderance of data supports the concurrent use of these two types of treatments rather than the idea that antioxidants somehow undermine or destroy the effect of the toxic treatment.

Here's a very brief overview as I see the whole topic, and that is that anti-oxidants, whether they're found in foods or as supplement pills, basically reduce the risk of various cancers; that they improve the outcome in over 100 health conditions; they improve the general sense of health and well-being; they can prevent and diminish the side effects of chemotherapy and radiation therapy; and that they can help in cancer healing and recovery.

None of those statements, of course, would go without being contested by somebody but I think this is the general feeling, that antioxidants have -- the more we learn about them, the more we discover that by quenching free radicals, and by some other means, they do generally contribute to our health very mightily.

Here is a general philosophical position that I agree with and I think governs the use of antioxidants by cancer patients. It is from Richard Horton, M.D., somebody I greatly admire, the editor-in-chief of the Lancet, probably the best medical publication in the world and it's called the "precautionary principle."

Let me read it to you. Horton says, "We must act on facts and on the most accurate interpretation of them, using the best scientific information. That does not mean that we must sit back until we have 100 percent evidence about everything. When the state of the health of the people is at stake we should be prepared to take action to diminish those risks even when the scientific knowledge is not conclusive."

I think that this applies exactly to the situation with chemotherapy and antioxidants right now. The scientific knowledge is definitely not conclusive, but patients have to act. Even taking no antioxidants is itself an action. We have to go with the preponderance of data and with our interpretation of that.

I also want to make clear something that's not generally addressed in this conversation and that is that chemotherapy and radiation have an effect on the natural antioxidants of the body, or the dietary antioxidants, as well as the other way around, antioxidants having effect on chemotherapy.

There are a number of studies, and all of these statements are substantiated by references in my book, by the way, that chemotherapy and radiotherapy can rob patients of antioxidants, in fact, can cause a state of either a partial or complete lack of vitamins to the point of causing the typical vitamin deficiency diseases.

Some of these are masked by the typical symptoms of cancer and cancer chemotherapy, such as mouth sores and so forth, that they can contribute to malnutrition and to the wasting syndrome, or cachexia, which is so common in advanced cancer, but they decrease albumin,

bilirubin and uric acid, which are naturally occurring forms of antioxidants, and that they generally increase free radical damage.

If you grasp this, you see that giving antioxidants is not so much necessarily adding something weird to the body as it is replacing something natural that's being taken away in the course of chemotherapy.

Now, I'll talk about some of the specific antioxidants. Again, there are 450, or maybe 480, scientific references in my book, and about 150 of them relate to the specific interactions of antioxidants with chemotherapy.

"In general, there is a highly effective synergism between vitamin A and chemotherapy," quoting from a scientific article. A lot of the studies, a lot of what we know about chemo and antioxidants has to do with one drug, adriamycin and its effects on the heart. Adriamycin is a very powerful, effective form of chemotherapy, but it has this very severely limiting affect of damaging the heart muscle. So, many studies, going back decades, were trying to find ways of mitigating or minimizing the side effects of adriamycin on the heart, cardiotoxicity.

Vitamin A appears able to do that. It also enhances the cell, cancer cell death in a test tube. There are clinical trials in Japan on the use of a protocol called FAR, which is 5FU, vitamin A and radiation, which were very positive.

Also, similarly, reports from France show use of vitamin A and vitamin A analogs along side chemotherapy are reported positively in clinical work, although as Pat McGrady pointed out to me today, he does not advocate using dietary antioxidants along with his program.

But in general, vitamin A has been found to have a profound anti-cancer effect. It is more or less a conventional medicine now for head/neck cancer, either vitamin A or its analogs, and as I say, quite a bit of data on its synergy with chemotherapy or radiation therapy.

Beta carotene is the most controversial member of the antioxidant family and most of this is because of the carrot study where people who received synthetic beta carotene had indeed a higher death rate and a higher rate of lung cancer than those who didn't receive the beta carotene. The study had to be cut short by the NCI about four years ago because of the discrepancy between the two groups.

I discuss a lot the preconditions for this or the possible reasons for this finding. In general, of course, natural beta carotene in food has been found to be protective against cancer, so people were really amazed by this finding.

I would say that the most likely thing is the people being tested were walking time bombs. They were all victims of asbestos exposure and heavy smokers, so may not have been typical of the population in general.

In addition, the form of beta carotene use was a synthetic product and there is a difference between a synthetic and a natural product. Beta carotene has been found to, again, to reduce heart damage from cardiotoxicity of adriamycin and it reduces the toxicity of two drugs, cisplatin and LPAM.

I'm rushing here a little bit, but you see there's a big territory to cover. Vitamin C I call the flagship of the antioxidant armada. Vitamin C also protects normal cells from adriamycin. It

prolongs the lives of test animals that are receiving chemotherapy. It enhances the effects of cisplatin and numerous and other drugs.

In the very key experiments carried out by Kedar Prasad at the University of Colorado, when he gave the drug, standard drug 5FU along with vitamin C, there was a 95.5 percent decrease in cancer cells. I could give you the figure, lower figures when you use either, vitamin C alone had no effect and 5FU alone had a much lower effect than that. Similarly, when he used vitamin C alone with radiation therapy, 98.2 percent control of the cancer cells, much more than when you use radiation therapy alone.

Then Dr. Simone, who will speak last today, I think is going to mention these, the latest fear stories about vitamin C, which I'm sure everybody in the audience has heard about and is concerned about, with good reason, so I don't have to go into that right now, because we'll be talking about that later, and I'd be happy to put my two cents in in the question and answer period, if you wish.

Vitamin E and chemotherapy. Vitamin E has been found to, in a clinical trial, to reduce P53 mutations, specifically in head and neck cancer. This is very important because P53 mutations indicate a more malignant, more dangerous kind of cancer.

So, while it didn't in this clinical experiment decrease the number of occurrences of the head and neck cancer, it did decrease the occurrence of the more dangerous form of head and neck cancer, which could be extremely valuable, of course, for patients.

In some studies, vitamin E reduced cancer and heart deaths in older patients by 40 percent. I realize of course that the heart study has been more recently disputed. But still, there are a lot of studies showing that the addition of vitamin E is beneficial to the heart and also has a dramatic effect on some kinds of cancer.

Again, this is another agent that reduces the toxicity of adriamycin. In this formerly mentioned Kedar Prasad studies, there was a 71 percent reduction in cancer cells when vitamin E was given with bleomycin, which is of interest, especially for brain cancer patients, and 85 percent decrease in cancer cells with 5FU, and an 82 percent decrease with cisplatin. Again, these were significantly, and in some cases, dramatically better than the results of giving just the drug alone. Prasad's paper really is a very important addition to our knowledge about the activity of these agents.

Two other agents of particular importance are glutathione and glutamine . Glutathione improves the clinical results with cisplatin and cyclophosphamide. I'm pointing out the, repeating this term "clinical," meaning of course that it was tested in human beings to counter the arguments you will frequently hear that there is only test tube or animal data to support the concurrent use of these agents.

In fact, there is some clinical data, as I've shown you, to support it, although good randomized clinical trials are relatively rare in the field.

Here's an interesting fact. Tumors are well known to be glutamine traps. If you examine a tumor, you will find that there's a high amount of glutamine in the tumor. And for that reason, many doctors, both conventional and alternative, have hesitated to give glutamine to cancer patients.

When a brave doctor at University of Arkansas named Suzanne Klimberg actually did it, she found that glutamine seriously decreased tumor growth and there's a series of very good clinical papers on exactly this topic, using glutamine as an anti-cancer agent.

Glutamine also has a very promising role in palliation of cancer patients who are undergoing conventional treatment. It prevents stomatitis or mouth sores, as well as various kinds of infections, and shortens hospital stays. These are all based on randomized clinical trials.

In a study done at Harvard, it was shown that the use of glutamine decreased the cost of bone marrow transplantation for patients with leukemia by over \$21,000 per patient. The cost of the glutamine itself is retailed at \$10 a day.

So, you can see that there is some enormous potential here in every study except one, and there have been confirmatory studies. Every study confirmed the ability of glutamine to shorten hospital stays, to decrease side effects and so forth, and that this is an antioxidant.

I don't have time to go into all of the other antioxidants and their effects on chemotherapy and radiation therapy. Just very briefly, some of the others I discuss in my book are co-enzyme Q10, picnogonal, which is derived from the bark of the maritime pine, and grape seed extract, selenium, zinc, melatonin. These are huge topics, and in the case of melatonin, there is a great deal of literature by Professor Lissone in Italy, clinical trials showing a beneficial effect of up to 20 mg per day of melatonin in a variety of cancers, including situations where it's used concurrently with conventional therapy.

But one could talk for a long time about these other agents. You could give a whole lecture about selenium. Many books have been written about it and it's extremely promising for many reasons. And even this hardly exhausts the lists, as I'm sure you're aware of antioxidants, potential antioxidants.

There's one other topic that I want to mention, and I hope I won't be going over in my time, and that is very briefly mention synthetic antioxidants.

When oncologists tell you that you shouldn't take antioxidants, their position is undermined by the fact that they themselves use a whole class of synthetic drugs whose purpose is exactly to be antioxidants.

I have a two-page discussion of this at the end of my book. It's a bit technical, but there is a drug called amifostine or WR2721, which is a synthetic variant on the amino acid cystine. It's just not questioned that amifostine "reduces radiation induced toxicities without reducing anti-tumor efficacy," according to scientists at the University of Wisconsin. And a major radiation textbook says "no evidence that tumor protection from WR2721 has been observed in these clinical studies," tumor protection referring to a drug's ability to shield cancer from the effects of treatment.

Another one is ICRF187, or cardiozane, same story. And finally, mesna, m-e-s-n-a, is a synthetic antioxidant without which it would probably be impossible to use the drug ifosfamide or IFEX, and these are all extremely powerful and somewhat toxic antioxidants that are used in clinical practice every day and they don't generate controversy because it's the doctors that use them, not the patients who are self-medicating with them.

The most important source of antioxidants, without any question, is the diet. If you eat a really super diet, you obviously need far less. But I think even in those cases, even with the best, with the, optimal diet, it's still very hard to get adequate amounts of vitamin E or Coenzyme-Q10, or a few of the other antioxidants.

So, here is what I would say, 10- to 20,000 units of vitamin A, 500 to 2,000 mg of vitamin C. This is controversial more on the alternative side. A lot of alternatives out there think I'm being much too conservative with this but I kind of follow the thinking of Andrew Weil on this, and I think that the latest data that has come out supports the idea that it's really not necessary to take much more than that.

I used to take a lot more, and now I'm basically taking 500 mg a day and think it's an adequate amount. Vitamin E, again, depending on your status, you shouldn't go higher than 1,200; 200 is really kind of on the low side. Four hundred is what I take, and you know, obviously, women with fiberoic breasts and other conditions might consider taking 800 and so forth.

Co-Q10, it's expensive, and so part of it is what your finances are like, but probably in the range of 30 to 90 is adequate, but in using it as a cancer treatment, which there's one study where they go up to 300, actually to 390 mg with that; that's in the experimental realm.

Lipoic acid that Lester Packer has talked about so eloquently in his book on antioxidants, zinc, selenium 200 micrograms. Americans typically get 80 micrograms a day in the diet. I myself eat two Brazil nuts a day. If you're like me and you're able to stop at two Brazil nuts a day, that's fine, and that way, you'll get slightly over your 200.

It's a nice, delicious, inexpensive way to get your selenium. It is the outstanding source of selenium in nature, by the way, and picnogenic, which is, as I say, from the pine bark. Or you can eat grape seeds, and grape seeds extracts, or just simply, eat grapes which are helpful for a variety of reasons, and if they are organic and sort of smallish, you can eat the pits or the seeds of the grapes and get the benefit that way and you don't have to have the additional cost or the pain of taking more pills.

Finally, the carotenoid. I say carotenoid as opposed to beta carotene because beta carotene alone may be dangerous. I'm still not sure about the meaning of the carrot study, but probably the natural mixed carotenoid, mixed. Carotene is harmless, especially when taken together, not just beta carotene alone, and taken with this overall mixture.

I cannot say with 100 percent assurance that antioxidants will not interfere with chemo or radiation under any circumstance. I found in my book ten situations that I thought warrant caution by cancer patients. The most serious one I think is tangeretin, which is a bioflavonoid found in oranges, and in animal studies, interfered with the action of tamoxifen and also had a very deleterious effect on natural killer cells. This was in the Journal of the National Cancer Institute last year and I think it should be taken seriously.

But there are products on the market that I could refer you to where they don't use tangeretin; basically, they're using a kind of a lemon bioflavonoid. But, you know, it wouldn't surprise me if we found in days, in years to come, that certain specific antioxidants interacted with certain specific drugs in a harmful way.

All I can say is, when I look at the entire scope of the data, while there are negative points, as there always will be in any topic, that the preponderance of the data supports the concurrent use of antioxidants with chemo or radiation.

So, I thank you very much.

DR. DREHER: Thank you Dr. Moss. I just want to underscore the fact that his book, Dr. Moss's book, *Antioxidants Against Cancer*, is an excellent overview of the subject.

I just wanted to make sure we had Dr. Salganik here. He'll be presenting another point of view. Are you ready Dr. Salganik?

DR. SALGANIK: Yes, I am.

DR. DREHER: Okay, I want to read a little quick biography of you before you begin. Rudolph Salganik is a research professor at the University of North Carolina. Previously, he was associated with the Russian Academy of Sciences, heading a laboratory of molecular genetics. His research was focused on the molecular mechanisms of mutagenesis and carcinogenesis.

In 1994, he started to work on the role of reactive oxygen species in carcinogenesis. Dr. Salganik and colleagues have shown that an increase in antioxidants hinders anti-cancer-effective drugs, whereas a depletion of antioxidants promotes apoptotic death of cancer cells.

I should add that Dr. Salganik has a really interesting paper in the May issue of *Carcinogenesis* which summarizes some of his animal research, which shows that actually depleting antioxidants results in tumor regression. This is quite a challenge, albeit just a series of animal studies. But it's quite a challenge to the prevailing thinking of a lot of people in the world of complimentary cancer medicine.

Dr. Salganik published more than 300 papers in peer review journals and books. He is a member of the Russian Academy of Sciences. It's my pleasure to introduce Dr. Rudolph Salganik.

DR. SALGANIK: The title of my talk is antioxidants, throat and colon. Since I am going to speak about antioxidants, it is best perhaps of reminding you what are the oxidants. And it's well known that oxidants is a context of our issue.

DR. SALGANIK: There are three main varieties of oxidants. The main source of oxidants are mitochondria and to a lesser extent, microsomes in the endoplasmic reticulum. So, here you see the mitochondria schematically present and ROS, reactive oxidant species, that is the usual abbreviation for reactive oxidant species and endoplasmic reticulum and separate source are phagocytes, which also generate not permanent and not mitochondria, mitochondria all the time, all our lives, in all our cells. And when people are speaking that they are by-products of our anaerobic life, it is not true; they are not by-products. Very important. I'll speak later about the importance and their functions.

Some of our experiments demonstrated the damaging effect of oxidants, cell damage. When their concentration is too high in our cells, and in some situations it is high, it is dangerous.

And oxidation of DNA and proteins is also much higher in these animals and oxidation of lipids is also much higher. These animals seem to have, we can see a number of degenerative

diseases. For instance, cataracts and lesions. Yes. And lesions of lungs, and carcinogenic alterations in the cells in liver. That is the manifestations of carcinogenic alterations in the liver.

Fortunately, we have antioxidants, Dr. Moss was speaking about antioxidants and it's well known that we have our endogenous antioxidants which are rather powerful. Superoxide dismutase and catalase are enzymes which have powerful antioxidant properties, they destroy free radicals and there are a number in nature, such as vitamin C, vitamin E, A, beta carotene.

So there is a number of powerful natural antioxidants together exogenous and endogenous they protect excess oxidants, when the concentration is too high.

But another side of the coin. Oxidants are important. They have important biological functions and one of the important functions is that they are mediators of apoptosis. Apoptosis is extremely important protectionary action but this kills selectively. Those kill selectively cancer cells.

It means because everyday in our body and our tissues, cancer cells appear and they are eliminated by a apoptosis which kills selectively cancer cells. And oxidants are essential mediators of apoptosis. If they are deficient, it doesn't work and we are in danger.

So, indeed free radicals are mediators and they are necessary.

So apoptosis kills most or even all anti- cancer drugs and radiation kills cancer cells by apoptosis inducing apoptosis and that is why free radicals in moderate concentrations are important in our cells because they provide our fight against cancer cells. They provide apoptosis.

NOTE: There was a technical problem with the slides and Dr. Simone began speaking next. Dr. Salganick's talk resumed later in the session.

DR. DREHER: Dr. Simone's first book, Your Defense Against Cancer is about cancer prevention. I have to say that I've used Dr. Simone's book as a very important reference work. It's my pleasure to introduce Dr. Charles Simone.

DR. SIMONE: his is a very important graph. This just says the life span of the cancer patient. What has happened to those patients since 1930 to the present?

You can see one curve has gone up dramatically, lung cancer. No surprise. More and more deaths, et cetera. One graph, one curve, has come down dramatically, stomach cancer. More refrigeration began in the thirties, less food additives, less stomach cancer.

But the important part of this graph is singular. All the other adult cancers since 1930 to the present, the year 2000, have not changed one little bit almost. Adult cancers, little or no important since radiation oncology began here in the thirties and twenties, combination chemotherapy in the sixties, immunotherapy in the seventies and all of our fancy technology, expensive dollars et cetera, research.

So, no matter what we have done to patients with cancer, it says here that a woman who got breast cancer today will live as long as a woman who got it in 1930, and there is prostate cancer, lung cancer, et cetera. So, given that context, let's move on.

SPEAKER: Are those survival rates, Doctor?

DR. SIMONE: Yes. These are mortality curves from the sheer data of the NCI.

DR. SIMONE: These are life spans of patients. This is sheer data from the NCI, published every year by the American Cancer Society in the January and February edition of CA-A, a cancer journal for clinicians.

DR. SIMONE: Let me see. It should not have been incidence, but the survival curves life span are the same. This is the free radical everyone's talking about. Most people know what's going on with them.

Simply, a free radical is an unpaired electron that brings with it high energy, very unstable, and mother nature says you can't have that kind of situation.

A free radical then imparts its harm to a cell, which then has cell membrane damage and that cell can go on to either repair itself properly or not. So, the free radicals cause cell damage and death generally.

Chemotherapy. Some chemotherapeutic agents and all radiation therapy generates free radicals, and hence cell death, theoretically. So, the whole bugaboo about the anti-oxidants story is very real. What about them?

Mother nature has given us lots of protection against free radicals, a protein coat, many vitamin E molecules and lots of dismutase enzymes.

Let's go right on to the other thing. This is our 10-point plan that we started in '81. We're going to go through this. We have that lifestyle changes alone in many diseases, particularly breast cancer has been studied the most, they can extend life spans of patients regardless of the treatments that they undergo.

Nutritional factors are important because we know that fatty foods will actually decrease the risk of a disease from its progression and also the causation of it. We teach patients all about the fats, cholesterol, triglyceride type foods to avoid.

High fiber foods, and we encourage vitamins, minerals all the time. We'll get into that in a second, and that's why you're here.

This is a question everyone wants to know. Do vitamins and minerals interfere with chemotherapy or radiation therapy. And the answer, little more categorical than Dr. Moss, is no. There's no interference.

What evidence do we have for that? We know that Dr. Moss already looked at this, but chemotherapy and radiation therapy will actually decrease the blood nutrient levels in all patients from something called lipid peroxidation. So, patients undergoing chemotherapy or

radiation therapy are at decreased levels of nutrients to begin with, the antioxidants, other minerals and vitamins also.

The major cause of death, and this is how I got involved in this area; when Vice President Humphrey was referred to me, he was dying not of his cancer, but of malnutrition. We know that 40 percent of all cancer patients die of malnutrition and not their cancer. Those 40 percent already have low intake of vitamins and minerals and many other nutrients.

So, right off the bat, most cancer patients are deficient. There's an increased response rate, a decrease in side effects when nutrients are given with chemotherapy and radiation therapy in lots and lots of cellular studies.

At the time this was written about 4 or 5 years ago, there were 51 references about cell studies when nutrients like vitamin C, A, K, E, D, B6, B12, carotenes, selenium, or cysteine as a single agent or in combination were used with either chemotherapy, tamoxifen, interferon, radiation or any combination of these modalities.

That's a mouthful, although what I try to do in a very short sentence is summarize the literature of the cellular studies. These number of references now have been over 100 since the last 4 years.

We know also that when animal studies were looked at with the same nutrients, others, C, A, K, E, D, carotene, selenium, or cysteine, as single agents or in combination, used with chemotherapy or radiation therapy, or any combination of those modalities, again, more response rate and decreased side effects.

So, we have cellular studies and animal studies that show the same story. No interference and higher response rate with lower side effects.

Well, that's fine for the test tube and the animal. What to do for the human? When you look at human studies involving now well over 2,000 patients, using nutrients like vitamin C, A, K, E, D, B6, B12, carotene, selenium, cysteine, as a single agent, or in combination or WR2721, which is a prescription drug, the medical oncologists and the radiation oncologists used in therapy to reduce side effects for another prescription drug used for the same reason.

When any of those combinations are used with tamoxifen or chemotherapy, and that implies many of the chemotherapeutic agents, all of them, interferon, or radiation, or any combinations of those, at that time, 4 years ago, there were 55 references, and again, no interference, decrease in side effects, and actually enhanced response rate. Response rate means tumor regression.

Now, in eight human trials, there was even actual increased survival, life span of the patient. That's the bottom line with any cancer treatment, can you increase the life span of the patient. So, human studies are very, very well documented, over 2,000 patients now, and lots of data for these things.

Again, remember what I said. Doctors are using these as prescription items, prescription antioxidants. These two agents were developed by the army to help prevent against warfare, radiation damage in warfare. So, these are now currently used in actual clinical programs all over as routine drugs, as antioxidants, to decrease the risk of side effects. At the same time, there is no interference with treatment.

We know that this data has been old information; it's not new. In the '70s, this many studies were done, both cellular, animal and human. In the '80s, you can see a rise a little bit, and in the '90s, lots more studies. So, this information is not new. It's very, very old. Three decades worth of information.

So, how does it escape some people? Well, big kickoff came when Jane Brody interviewed Dr. Larry Norton at Sloan Kettering. Larry Norton is a chemotherapist who treats breast disease, and he said in this article, published on a Sunday front page, that research at Sloan Kettering shows that large doses of vitamin C could blunt the effects of chemotherapy in breast cancer cells. That was never published at that time; that was '97, and we showed at that time, there were over 250 references that showed the complete opposite.

He also said wrongly that it is known that folic acid engaged the effects of methotrexate. It's not folic acid, the vitamin, that does that, but rather folinic acid, which is an analog of folic acid and folic acid has nothing to do and no blunting effects of methotrexate.

So, he misspoke about this and he was wrong about this. Now, let's talk about the paper from which he has derived that information. That infamous, or famous paper, whatever way you want to talk about it. I thought we would talk about it here in an unbiased way, if I could. David Golde is the senior author of that particular paper. It was published in September of '99 Cancer Research.

In Dr. Golde's group, he is the senior author. There are two other authors on it, Dr. Agus and I have the paper here, Dr. Vera. What they did was simply look at a cell, cellular work. This is cellular work. They injected some vitamin C into animals and found out that cells were taking up or not taking up vitamin C.

He found that the tumors in these animals were taking up large amounts of vitamin C, not very large but moderate amounts anyway. Brain cells, normal brain cells were picking up much more in the same experiment.

So, the conclusion from his experiment is only one, that cells take up more C; cancer cells pick up more C than most of the normal cells in the animal. That's the conclusion that the paper reported.

Now, what then got translated is a very different story. What got translated by him and the media was that if there's more vitamin C in the cell, and vitamin C protects against free radicals, then that cancer cell is being protected against the harm of free radicals.

So, he made a huge leap. As a scientist, you can't do that. But he made a huge leap from a fact that cancer cells take up vitamin C, which was known long before he published this in '99 by other people in the country.

So, he leapt from that basic fact to this, that vitamin C interferes with chemotherapy, radiation therapy. So, I think that was unbiased enough concerning Dr. Golde's paper.

So, he did do nice work. He did show the mechanism by which the vitamin C is taken up in the cancer cell but that's all he showed. That's all he could report, but he leaped from that to interference with chemotherapy in a cellular study.

So, what I then did, because of all of this commotion out here, I asked consecutive patients that came into our center the following questions, and you'll be amazed at this.

I asked them do they take vitamins and minerals. Over 80 percent of them said yes. I then asked consecutively, did you take them before your diagnosis, and they said no. Well, most people generally who have cancer are generally elderly and they were not of the mind set to take vitamins and minerals most of the time.

The third question I asked them, did your doctor tell you not to take them with chemotherapy or radiation therapy, and the great majority said yes.

Then I asked them a very important question. I said, after being told not to do so, did you? And they said no, I wouldn't do it; the doctor told me not to do it, I'm not going to do it.

Finally, the most important question, I said, if you knew that the vitamins could help you during your radiation therapy or chemotherapy and by doing this and this and this, with sound scientific data behind it, but you're told not to do it by your doctor, would you do it? And they said, not at all.

What this says is very important. The doctor has a tremendous influence over the patient. Right or wrong, the patient is going to listen to the doctor. So, what we need to do is educate the physicians who take care of cancer patients to really look at this issue. The issue is out there, 350 references are published that show no interference and enhanced killing, decreased side effects.

Now, why is this possible? We have all these references that show that there's no interference, but we have this nagging piece of intuition that says, geez, antioxidants should interfere with free radical kill. Here's probably why our hypothesis, probably the reason for it, and Dr. Golde's paper actually supports this information.

Cancer cells pick up excessive amounts of antioxidants. We know that. Dr. Golde said that. It's been reported before. So, what about it? The normal cell does not. The normal cell does not pick up excessive amounts of antioxidants.

Well, when antioxidants get in the cell, they actually shut down the oxidative reactions. No oxygen, you can't live. As simple as that. That's one reason. Antioxidants also inhibit protein kinase C that would ordinarily increase cell division and proliferation.

A third reason perhaps is that the antioxidant concentration also inhibits oncogene expression. Lastly, they probably increase the amounts of inhibitory growth factors, which we know they do, and they probably do so again here.

So, these acquired features override the general protective action of antioxidants. So, that's probably why what we see in 350 papers say that antioxidants don't harm us, actually increase kill rate at the same time decrease side effects.

This all leads to increased cell death, decreased rate of cell proliferation, and increased induction of differentiation. Dr. Kedar Prasad and I have talked about this and that's our hypothesis about why this is so.

So, again, intuition does not pan out when you see basic scientific facts. Belief systems are reserved for churches and synagogues. Science should rule the basic facts.

This is more of our 10-point plan. I think we have a few minutes. Point two is no smoking with a cancer patient. Alcohol, we know that two or three drinks a week is enough to increase the rate of growth of a tumor, particularly breast.

Radiation affects only when you need it. If you need radiation therapy, of course, for local control, you do it, or for other reasons. Air, water and work places and things like that, we'll just skip a few things.

The seven warning signs I think most people should know, especially cancer patients. If you have one cancer, you're more prone to get another cancer.

Exercise is very important. If you exercise 20 or 30 minutes a day 4 times a week, you actually boost the human immune system.

We know that modifying stress with warm water, relaxation, music, spirituality, sexuality, all of these have a pronounced effect again at boosting the immune system.

And lastly, a good physical examination, looking from head to toe in all cancer patients, or all patients in general, is very important.

So, I think when you look at lifestyle changes and include rational uses of vitamins and minerals for the cancer patient, it's not only very helpful, but also should be done.

We can decrease the side effects of chemotherapy. We can decrease the side effects of radiation therapy, and at the same time, increase kill rates of those modalities with no interference. That's the key thing, no interference, and that's the message we have to get out.

Intuitively, that doesn't make sense. But when you look at 350 references, 350 articles in cellular work, animal work and 2,000 cancer patients, the science is there.

Thanks very much.

DR. DREHER: Dr. Salganik's slides, there is a problem with some of them. Some of them are too large. The technician just informed me that they've now straightened out to the point where some slides will be fine and some will not be fine.

So, we're going to kind of skip over the ones that don't look good and stick with the ones that look good.

DR. DREHER: We're ready.

DR. SALGANIK: Thank you for your patience. So, I try to demonstrate some slides showing how vitamin E inhibits the effect of cisplatin one of the widely used drugs. It is about damaging effect of radicals in these 4 animals. That is how vitamin E inhibits the apoptic effects of cisplatin, cancer killing effect of this drug. Because free radicals are inhibited and that is the reason why cisplatin stops to work. Excuse me, I am not against vitamin E, just demonstrate the experimental data.

We will we have to keep in mind that something is going here. So if deletion of free radicals interferes with the effect of anti-cancer drug, maybe if we are able to increase the concentration of free radicals in human cells, maybe there is a way to enhance apoptosis and to kill cancer cells, and we are playing with transgenic animals with brain tumor.

I will not tell how this tumor was induced is a special construction. But that is the result of antioxidant for diet in animals with brain tumors. What happens, first of all, depletion of antioxidants enhances the concentration of free radicals in tumor cells.

That is concentration of free radicals (bright green) and that is also free radicals, and because of high concentration of free radicals, there is an increase in the number of apoptotic cells. The cancer cells are killed by apoptosis, not in controls.

And there is what happens with tumors. That is tumor in animals on a standard diet and that is in animals with an antioxidant food diet. You see that there is some void space many cancer cells disappeared and the volume of tumor became small.

Then you can see the quantitative data. That is the number, the increase of free radicals (blue), and that is increase in apoptosis, very, very high and decrease in the volume of the tumor.

A very simple approach, just change the diet, and depletion of antioxidants. I don't tell you to have immediately to deplete antioxidants from cancer patients, but nevertheless, I will try to explain what is the reason. Antioxidants might be very important to protect healthy people and I continue to take antioxidants because they are protective.

But, nevertheless human population is heterogeneous and it is nature. We are different in all our features, including free radicals. It is animal experiment just animal population and that is a higher level of free radicals in this part and low levels in this upper part of this curve. Normal animals, their heterogeneous is a level of free radicals because it is nature of we are different, animals and humans, and we are -- we are also different.

There are people, groups of people with very high level of free radicals and they're in danger. They should be protected. And people's whose low level free radicals, and they are also in danger because apoptosis is poor in these people and they are poorly protected from cancer and from infectious disease.

It means that antioxidants are very useful in people with high levels of free radicals, and they might be damaging for people who have low levels free radicals, unfortunately. So far we ignore the heterogeneity of human population. We don't know who is who and it is important, because we can protect, we can prevent cancer.

Because if these people, they're in danger. The ability to acquire cancer is much higher than in people, in normal people. We must know who is who. Screen populations is important and we don't know what is -- how big is concentration of antioxidant and what is the nature of antioxidants which can protect us from high level free radical and what about people with low free radicals, maybe not antioxidant but pro-oxidants are important for them. And it's also a matter of study, it should be studied.

So, I really believe that our data they are not provocative, we don't say that we have to stop to use antioxidants, but just pay attention. It is important issue and I believe that new studies related to the heterogeneity of the human population to the use of antioxidants which may

indeed protect with people with high level. It may contribute greatly toward international health. Thank you.

DR. DREHER: Thank you, very much. Thank you, Dr. Salganik.

We now have a very eminent commentator. Dr. David Rosenthal is the immediate past president of the American Cancer Society. He's our commentator today. He's served as the director of Harvard University Health Services since 1990. He's also a professor of medicine at Harvard Medical School.

Dr. Rosenthal serves as senior physician at Brigham and Women's Hospital, Beth Israel Hospital, and the Dana Farber Cancer Institute in Boston, Massachusetts. He is the Henry K. Oliver Professor of Hygiene at Harvard University, a graduate of Harvard College. Dr. Rosenthal received his degree from Tufts University School of Medicine, directed the Clinical Division of Hematology at Brigham and Women's from 1978 to 1990.

Dr. Rosenthal has received a number of awards, including the American Cancer Society's St. George Medal. After Dr. Rosenthal gives us his comments, we will be taking questions and feel free to stay a little late so that we can get a little bit of a debate or conversation going.

My pleasure to introduce Dr. David Rosenthal.

DR. ROSENTHAL: Thank you, Henry. While I've been listening to this, as you have, and trying to figure out, well, what is it that we should do. I attended a celebration of a Harvard campaign and heard two presentations by investigators of the Harvard School of Public Health just two weeks ago.

Dr. Willett, who's knowledgeable in nutrition and has done a lot of the basic research in nutrition, along with many of his colleagues, and everybody ran to him after the conference, all of the big donors at Harvard said, okay, Dr. Willett, what do I do. He says, well, this is what you should do, and he very much like Ralph and Chuck, said, well, I take a little bit of this, I take a little bit of that and I avoid a lot of that.

How much of that is based on science, he was asked. He said, well, probably about 20 percent is based on science; the 80 percent is what I think is right and I'm afraid we're still in that think phase. I think we're still in the infancy of the research into nutrition.

I want to try to get that in a few minutes, a perspective. There's no question that I think that we've come a great distance since the mutilating surgery of radical mastectomies and radical bowel surgery and radical neck surgery, and then into very aggressive, really disabling chemotherapy and destructive radiation therapy.

We're now modulating all of that into much more types of therapy that are more acceptable and compatible with longer life. I think that we're also at the break front of a lot of new therapies that you've heard about.

For example, just think of what you just read about just a couple of months ago about taking a simple pill and curing a disease called chronic myelogenous leukemia. It just puts things into perspective of where we're heading with gene therapy and with monoclonal antibodies.

CML, chronic myelogenous leukemia, is a disease characterized by a genetic abnormality, a new gene product. What the investigators out in Oregon Health Science Centers have found out, that it's an enzyme, and if we attack that new enzyme with a simple medication, we produced ten out of ten complete remissions.

This is a disease that we're currently throwing the kitchen sink at. Chronic myelogenous leukemia is a disease that we treat with total body radiation therapy, high doses of chemotherapy, and everything else. And we wipe out a bone marrow and then replace it with a healthy one. Two months in the hospital. Translate that into one single pill, one single shot.

This is where things are headed. I just wanted to put that perspective out there. When we talk about, that's the preliminary result of. Is that going to be the next 90 patients, going to be the same way as those first 10 patients? We've got to extend the studies.

The same thing with the angiogenesis inhibitors. We've seen some results in animals. How are those going to be translated into the larger clinical trials when we find out what is the right dose of the medication, of the vitamin, of the pill? What's the best way to give it? What's the frequency that we can give it?

If we give it in too high of doses, are we going to see side effects and complications? So, to answer the types of questions that you have, what are the best doses to take? What are the best medicines to take? I don't think we know exactly, and that's why you saw wide ranges.

I think we also should be aware of what came out of the Institute of Medicine Report just recently. I'm sure you all read it. It was about medical errors and the title of it was "To Err is Human."

What was written in that report was that in hospitals we are killing anywhere from 45,000 to 90,000 patients a year. We are killing 45- to 90,000 patients a year. The majority of those deaths, the majority, the largest percentage, is due to drugs, medications, and drug-drug interactions.

Whether it's the wrong drug, the wrong dose, a drug given with another drug that's causing a severe and fatal side effect, and fatal effect, we don't know. But that's the data that we're starting to get, and it's very disconcerting and raises a significant concern on all our parts that we need to do more about this.

Well, I'd like to just briefly tell you my story. Do I take antioxidants? Yes. Why? I became part of a physician study way back in the 1970s. I was offered by a Harvard physician study to take an aspirin every other day versus a placebo, something that looked like aspirin but wasn't aspirin. And on the other day, I was told I could take either beta carotene, environmental side effects, and on the other day I was told that I may either get beta carotene or a placebo.

So I went on this study. I didn't know very much. I was a youngster in medicine. I said, well, I'll do it. I didn't realize the potential side effects and so forth, so I did, and obviously some of you in the room are probably very well aware of the studies, that the aspirin every other day became very significantly associated with a decrease in -- men; this was only done in men. Now there's a physician's/nurses study that's done the same way.

But there was a decrease in strokes, heart attacks, from the aspirin, and also interesting, a side effect that there was a decrease in the mortality from colon cancer, totally unexpected, but a result, a very large study that showed that result.

On the other hand, the beta carotene, which was looking at cancer as their initial goal, does beta carotene reduce the incidence of cancer? They came up that it really didn't, at least for the length of the study so far, which is about 20 to 25 years, except in one instance where it was associated with an increased death rate in lung cancer.

Now, again, it was not stratified as far as smokers are concerned. But the question was in smokers, does beta carotene make it a more significant disease and accelerate it's growth? That was the question. That's not an answer, but it's certainly a suspicion.

So, do I take antioxidants? Yes. Do I believe that they cure cancer? No. Do I believe that they can prevent cancer? Yeah, I do, in many ways. Do I want to take them as a pill or do I want to take them as a natural food?

It's very interesting that if you look at what the Asian population does in the Far East, the Asians have about anywhere from 15 to 20 servings of fruits and vegetables a day. Their incidence of certain cancers is much lower than ours. They do have higher incidence of gastric cancer due to other things, but their incidence of many cancers is much less with that high fruits and vegetables, which contains all of the antioxidants we've been talking about, lycopenes, vitamin A, vitamin C, vitamin E. So, do I want to take it as a pill form? Do I want to take it in natural foods?

In the pill form, what dose do I need to take? Is my digestive system the same as 99 other people that it's going to be absorbed the same way and give me the same blood levels?

Those are the kinds of things that I really think we don't know as yet. So, I think we do have to be careful of recommending doses overall, but I think we need some more research work on that as well.

The drug-drug interaction. Why did I mention 45- to 90,000 death a year? I don't know what's causing that but we really feel that there is great concern about mixing medicines. We've become a very medicated society. There's a great deal that's over the counter now that's unregulated.

The federal government is currently dealing with that. The FDA is currently dealing with that. You'll see a number of bills before the legislature, legislative part of it, dealing with regulation of over the counter medications.

Who do we trust? What agency that makes these vitamins is making the right ones? So, there are a lot of questions that need to be answered. You know, for example, just to give you one incidence, we have to be careful of our own individual self about what medications we're on.

For example, if I'm on coumidin, a blood thinner, for rapid heart rate and I want to keep my blood thin, I've got to be careful about how much vitamin E I take because there are potentiating effects. In other areas, there are de-emphasis of medication effects. So, there's a lot of this drug-drug interaction and physicians are really trying to deal with this on a day to day basis and they're getting lots of feeded material coming from all different directions.

It raises the question about the last point I wanted to make before I sit down, is, what is going on now and what are the trends? I don't like to point fingers, but what I like to do is to try to see where we're headed in moving this field and in moving the research into this and the clinical applications so that we can see a decrease in the risk of people getting cancer and also improvement in the quality of life of people who are afflicted with cancer.

I'm not sure when Chuck did his survey, but I'll bet you if you do some serial surveys, you're going to see some changes. You're going to see dramatic changes.

In the medical schools, there are now complimentary therapy programs going on in education in students. This is rapidly going on. The number of medical schools that have programs now is just logarithmically going up, and there are a lot of medical schools, so essentially, probably within the next 5 years, 100 percent of the medical schools will have programs in this field.

You'll also see much greater amounts of research from the federal government being put into the study of these areas, of the use of antioxidants in cancer, as a prevention, and also in complimentary attitudes with therapies.

I think you'll see changes in the perception of the physicians as they're coming up the ranks. I think that so much is being put on physicians these days, a lot of external forces about regulations and so forth, that their primary reason is to protect the patient and that's why there's sometimes concern.

But I would hope that you're going to see some changes, that you're going to see physicians being much more receptive to you as you come in and say, Doctor, what do you think about vitamin C, what do you think about vitamin E along with my chemotherapy, what do you think would be the best thing for me to do at this point in time?

So, I'm hopeful that you will see more of that in the very near future. Thanks.

DR. DREHER: Some questions. We are -- my experience with physicians and with cancer patients, the actual entrenchment on this issue, antioxidants and chemotherapy and radiation.

There is actually a harder line now. Physicians and oncologists are more upset about this one issue than anything else. If you want to do mind-body, you want to do spiritual, you want to do prayer, you want to do crystals, you'll get their blessing, but you will not get their blessing to take antioxidant, antioxidants in supplemental form.

So, we really are dealing with sort of an interesting, unique issue here, and I think that our commentator side have done a wonderful job of addressing the multiple issues. I'm going to kick off with one question, then I will go right to questions. I just want to start with this one.

The one question is, there's a contradiction, and the contradiction is that theoretically, antioxidants should interfere with chemotherapy and radiation, or at least with some forms of chemotherapy and most forms of radiation, because, according to a lot of the literature, chemotherapy drugs do depend on free radical damage to cancer cells, as Dr. Salganik has pointed out.

Whether it's apoptosis, the free radical damage induces apoptosis or damages DNA or both, that seems to be a little controversial. But one way or another, free radicals damage cancer cells. Chemotherapy agents damage cancer cells via free radicals.

So, doesn't it make sense; this is defending the doctors' position, mainstream doctors, that if you take antioxidants, you really may well interfere. Dr. Simone and Dr. Moss have pointed to just a myriad of studies. In vitro animal and human studies have suggested this is not the case.

Well, if the preponderance of evidence suggests that this is not the case, why? Why wouldn't antioxidants interfere with chemotherapy if in fact chemotherapy and radiation depend so much on free radical damage? That's my question and as soon as it's answered, we'll take questions. Thank you.

DR. SIMONE: I showed a slide about that, that the hypothesis that I and Kedar Prasad have shown is that the cancer cell -- in fact, we can put that up again. The cancer cell takes in more antioxidants than the normal cell.

Antioxidants will do a number of things. It will shut off the oxidative mechanism, and hence, not allow the cell to use oxygen. It will increase a kinase system that will shut down the proliferation and reproduction of the cell and several other things. It will stop the cell from reproducing and growing.

DR. MOSS: Well, of course, I don't think anybody knows the answer to that question. You know, we're empiricists. We go with the evidence. One radiologist did suggest an explanation to me, and that is that the beam of radiation is so intense that it's like dropping a bomb on those cells.

It means you could take all the vitamin C in the world and it's not going to save a cancer cell that gets into the line of fire of a radiation beam. But the collateral cells, you know, the innocent bystander cells, it's like you're distributing bandages and antibiotics to those people and those cells are going to be protected and the net result of protecting the collateral innocent normal cells could be that you are then going to boost the general health of the person and increase their life.

That's probably not strong enough to do anything to the powerful effects on the cancer cell.

DR. SIMONE: Again, what I mentioned was simply a hypothesis. I think it makes a lot of sense. But the fact is, the data show that it doesn't interfere. That's the facts. It doesn't matter what the issues are. The fact is, no interference.

DR. DREHER: Okay, yes.

SPEAKER: ----.

DR. DREHER: The question was whether Dr. Moss is referring to radiation and you are asking whether chemotherapy it also has the same effect. Can that same analogy be applied to chemo as well as radiation?

DR. MOSS: Not all chemotherapy works by generating free radicals. Only some of the drugs do, like the alkylating agents. But there too, I don't know if that analogy holds, but I can just say that there is no evidence that in a case of the alkylating agents, that the antioxidants interfere. So, I don't know whether the analogy would be the same.

This was cited to me by a radiologist.

DR. DREHER: I want to underscore one point that Dr. Moss just made, which is that it is very important that cancer patients look at the specific drugs, do some research about the specific class of drugs they're taking because some do depend on free radical damage and some do not.

The alkylators do. The platinum-based drugs I believe do, but others do not. I believe the taxanes do not. Okay, they're saying it doesn't matter.

SPEAKER: ----.

DR. DREHER: I believe taxol does not depend on free radical damage in order to kill cancer cells, and therefore, there shouldn't theoretically be a problem. Yes, sir?

SPEAKER: ----

DR. DREHER: Does anyone want to comment on either part of that? It's an interesting comment, that according to this medical oncologist, most agents do not really depend that much on free radical damaging mechanisms of action. Okay, yes, sir. Oh, I'm sorry. Dr. Rosenthal.

DR. ROSENTHAL: Can I just say something about the little mistakes? These weren't known doses of chemotherapy. Yes, there are lots of known side effects and known deaths, but these were the unknown. These are 45,000 to 90,000 people who died unexpectedly of complications that weren't recognized and a lot of them were due to drug-drug interactions.

DR. DREHER: But in addition to that, it was shown in the Journal of the American Medical Association in 1998 that about 104,000 people die in the United States each year of correctly administered drugs. So, even when drugs are given properly, there is still a very large number of people who die from the effects of those drugs.

I want to underscore what Dr. Moss just said. There was a report I think in yesterday's paper that the FDA is cracking down on a particular Chinese herb. Do you know the name of the herb, Dr. Moss? I can't remember it. It's not one that I was very familiar with.

DR. MOSS: ----.

DR. DREHER: It's a fungi or something. It's fairly obscure, very obscure Chinese herb, according to Dr. Moss, and there was a huge brouhaha in the media just yesterday in all the papers and on the national news that this herb has been shown in some studies to possibly increase the risk of cancer and now Dr. Kessler is very, very upset from the FDA we have to regulate all herbs much more stringently.

I agree with a bit of what he's saying, but one of the things that is neglected, as I think Dr. Moss would agree, is that, you know, certain chemotherapy agents cause cancer. Secondary cancers are not uncommon in cancer patients who undergo long courses of chemotherapy, particularly lymphoma and other settings.

So, I think there's a double standard. Can I take some more questions? Yes, sir.

SPEAKER: ----.

DR. DREHER: That's a very good point. I think everyone heard that. Does anyone want to comment on that? Dr. Simone?

DR. SIMONE: I think that explains exactly what we've been talking about. Once the antioxidant gets in, it shuts down the system because there's lots of pro-oxidation inside the cell.

SPEAKER: ----.

DR. SIMONE: I agree.

SPEAKER: ----.

DR. DREHER: Is that right? The gentlemen just in the back adding to what you said, said it's the free radical damage that's causing, not the oxidation per se. Is there a distinction there that anyone wants to comment on? I'm not sure what you mean. I think they're kind of one in the same, hand in hand.

I think one of the things that we're learning, you know, with these in vitro studies is that the antioxidants do their actions in the body as opposed to in the test tube, are extraordinarily complex.

But to try to parse out what antioxidants do on an in vitro basis and point to in vitro studies that agree with what you agree with and not to those that disagree with what you feel, is a very tricky business because sometimes antioxidants do act in a pro-oxidant fashion.

The data presented here by Dr. Simone and Moss suggests that it acts as a pro-oxidant against cancer and acts as an antioxidant protecting normal tissues.

SPEAKER: I wanted to ask. There seems to be a controversy over whether synthetic or vitamin E would ---- I believe is as effective or whatever as the naturally occurred form of ---- or maybe it's the other way around.

Does anybody have any information about whether you're suggesting to people that they take antioxidants? Is this something that makes a difference?

DR. DREHER: The question is about form, the proper forms to take a vitamin E and other antioxidants. Would somebody like to handle that?

DR. ROSENTHAL: The purists would say that natural form is best, but the body doesn't know where you brought aspirin, whether you got it from K-mart or Bayer.

SPEAKER: But the natural form is from the aloe ----.

DR. ROSENTHAL: I understand. But I'm saying that the body really doesn't recognize the source. Just sees the molecule. But there is lots of controversy and you'll hear right here.

DR. MOSS: I'm not a sentimentalist on this issue and I like people to be able to save money, but, you know, in the wake of the carrot disaster, the carrot study, a number of different groups began to look at this question of synthetic versus natural beta carotene, and there's a group in Israel that found a ten-fold higher accumulation of natural beta carotene in the livers of lab animals than of synthetic beta carotene.

They wrote, I'm reading from my book, "attention should be paid to the different sources of beta carotene when testing their efficacy, such as their possible role in the prevention of some types of cancer."

In a very similar study done in the University of Illinois and also in China, so I would say when I read these studies, I started to have a new regard for natural sources of vitamins as opposed to synthetic sources.

SPEAKER: How many of those antioxidants naturally occur as food sources?

DR. DREHER: Yes. That's an awfully good question.

SPEAKER: ----?

DR. DREHER: The question is, why do we need all these studies to go back to nutrition if nutrition contains maybe the antioxidants we're talking about? That raises the issue of the fact that there's been no question epidemiologically, a leap between foods, plant-based foods rich in antioxidants and cancer prevention and in some instances improvement, improved outcome of cancer.

Mitchell Gaynor, who is the medical oncologist here once said to me, you know, broccoli is just full of antioxidants. Are you going to start telling patients not to eat broccoli, not to eat carrots, there may be an issue of dosage in the argument, the counter argument to that is that you start pushing the dose with supplemental antioxidants, you may be reaching a threshold beyond which there is some interference.

That's against theoretical and Drs. Moss and Simone would argue that the data still does not show any interference, so that's the bottom line.

Because the microphone was not used by the audience questions some of the questions were not recorded here the dialog picks up as follows:

DR. DREHER: I'm going to take off on your point and frame it as a question to the panel quickly, and that is, how much of the trouble that people get into is this isolating a particular antioxidant?

It may behave very differently in the body than when it is combined with a natural ray or a spectrum of antioxidant, antioxidants that work together in a synergistic fashion.

How much does that explain the negative result that we have in the carrot trial, the beta carotene trial, and how important is that for clinical practice for patients who want to know, should I take this, that, the other thing, or should I take a spectrum? Can somebody respond to that please?

SPEAKER: ----.

DR. DREHER: Well, I think it's -- you know, it's suggested in my book that that's probably part of it, is the isolation of one carotene and the use of that in exclusion to the other, you know, balanced carotenes.

Also, I totally agree that the primary source of antioxidants should be in the food. You know, there is such thing as ORAC values, which are the equivalent of antioxidant, the antioxidant power. The average person in the United States gets 1,200 antioxidant units, if you will, per day.

If you follow the National Cancer Institutes recommendation, five half cups of fruit and vegetable serving per day, you can boost that to 1,640. But if you deliberately choose a diet that's high in the most powerful fruits and vegetables, you can raise that to 6,000 a day and that's what I try to do. It's what a lot of us probably are doing when we eat, you know, more or less, vegetarian diet high in colorful fruits and vegetables.

I'm just wondering how the oncologists in the audience who fear the use of antioxidant supplements, how they feel about -- are they ready to warn their patients not to take diets. That is sort of your point, whether they're ready to warn the patients don't eat red peppers, don't eat broccoli, don't eat grapes.

A few more questions were deleted here due because they were not recorded.

DR. DREHER: It's been a fascinating discussion. You've been a great audience. Thank you for your patience and for your excellent questions and your interest. Thank you very much.

(Whereupon, the PROCEEDINGS were adjourned.)

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