

CENTER FOR MIND-BODY MEDICINE
COMPREHENSIVE CANCER CARE 2000

CONCURRENT: Glyconutrients

PRESENTER: Reg McDaniel, PhD
MODERATOR: Susan Lord, MD
COMMENTATOR: Daniel Nixon, MD

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P R O C E E D I N G S

DR. LORD: Welcome you all. This is the breakout session on glyconutrients. I'm Dr. Susan Lord. I'm a family practitioner here in town, and I work part-time for the Center for Mind-Body Medicine.

I'm very, very interested in nutrition, both in my practice and in developing curriculums and medical schools and for the public and so use nutrition in my practice, and I also am interested in supplements that can help people heal in a variety of ways.

Glyconutrients came to my attention, actually, about two years ago, when I was working with a patient with hepatitis-C. I had pulled out all of the stops with her, and I was getting nowhere, and her health condition was deteriorating before my eyes, to the point that she was nearly bedridden. Working on the Internet, she came across these products called glyconutrients and started taking them.

She stopped everything that I gave her and started nothing but these, and her health started improving immediately, to the point where she is in excellent health today. That got my attention.

Last year for our cancer conferences, I did more research on these supplements. I understood that they seemed to be helping cancer patients who had gone through chemo and radiation. It helped them with quality of life and keeping their blood counts up.

Last year at the cancer conference, we invited Dr. Glen Holland (?), who is an oncologist from the Midwest, to come and to give a very, very preliminary presentation about these compounds. It was a little more than anecdotal. He did have some data, but it was very preliminary. But it looked promising.

One of the missions of the Center for Mind-Body Medicine is to encourage and support people that look like they might have another piece of the puzzle to come forward and have a forum to share their work. We are not making any definitive decisions or supporting any particular product, but we just feel that there has been no forum up to today for people who are not in the mainstream to get their work heard about. So that has been our purpose, to provide that forum.

The information we heard last year was interesting, and we felt that it deserved a further hearing. So we have invited Dr. Reg McDaniel to come today to talk in more detail about his work.

What we are going to do before I introduce our speakers is the format for today. Dr. McDaniel is going to talk probably for about 20 minutes, 25 minutes, on the biology of glyconutrients so that you can begin to understand why this might be such an important field for us to take a look at. It is a relatively new field, and there has been tremendous interest generated around the world in the last couple of years.

He is presently president of a company called Mannatech that is producing these nutraceuticals. Unfortunately, there are no other companies that are yet advanced enough to do it. He has had to do research on his own backed by the company. This is not an ideal situation, and we all know that, and he knows that most of all.

We are looking for evidence that would support a decision to try to get outside funding and outside evaluation to corroborate some of the findings that he has found.

After he speaks to us a little bit about the biochemistry, and I'm going to ask him to try to speak in terms that all of us will understand, both laypeople and professionals, and I know that he is very good at that because he has worked with me some. Then he is going to give us a best case series.

This is really the first stage of research that we do after we hear so many anecdotes that we really want to begin to document what is going on. So he is going to tell us about some of the cases that he has seen and the evidence that he has gathered that glyconutrients might be a part of an effective, comprehensive cancer care program for cancer patients.

Dr. McDaniel is an assistant clinical instructor in pathology at the University of Texas Southwestern Medical School and medical director of the Mannatech Company. He is published widely and has really single-handedly gotten much of the research about this kind of biology off the ground.

After Dr. McDaniel has done his presentation, we're going to hear from Dr. Daniel Nixon. He graduated from the Medical College of Georgia in 1969 and was a fellow in oncology at Massachusetts General Hospital. He is a professor of medicine in the Department of Experimental Oncology, the Medical University of South Carolina, and a Folk professor of experimental oncology at the Hollings Cancer Center.

He is presently heading up the American Health Foundation. This is one of the few foundations that actually is concerned about prevention in education, public education, about staying healthy, with a particular interest, I believe, in cancer. He is also extremely knowledgeable about nutrition, so he is an ideal person to come and help us make sense of the data that we are going to hear and give some recommendations about what the next step might be in evaluating this promising new therapy.

So with that, I will give you Dr. Reg McDaniel.

DR. MCDANIEL: Thank you, Dr. Lord. I wish I measured up to the introduction. I'm not president. I'm the medical director. He makes about three times as much I. There is a big difference there. I hope I am better at science than I am at business. There is supposed to be some humor in there, but you missed it.

I was sitting here thinking, having been in the plenary room, that different meetings have such different atmospheres, that a neurology conference, ob-gyn, and they are laughing and all.

You are used to, if you go to a cancer meeting -- it was only doctors and nurses, but it was pretty somber. But now that more and more patients are coming, it is getting even more somber. It is almost like we are forgetting that laugh is for living, and that we should smile and laugh a little. I know when I get before a group like this, there are those that have already got their minds made up there is nothing here to hear, and that is the only reason they came here, is to confirm that.

It reminds me of a soldout play or stadium which happened when three college boys from Texas got to Atlanta for the Olympics, they couldn't get into the stadium. It was a closed, just like a closed mind. They began to conspire how to get in.

So one old boy went and got on his Adidas, sweatshirt, and pulled up a sewer lid, came trotting up to the gate. They said, who are you and what do you think you are doing? He says, I'm William Wellington III, discus. They said, oh, a participant; go right on in.

The other boy saw it and he said, that's a pretty good idea. So he tears down a TV antenna, gets the pole, in his Adidas and sweatshirt, and he comes up to the gate, and they say, who are you and what do you think you are doing? He says, Carlton Farrington, Jr., Rice University, pole vault. Oh, a participant; come right on through.

So the other boy likes this, gets him a barber smock, pair of old gray mule long- cuff gloves and several twines of sharp, bright barb wire. He comes up to the gate. And they say, who are you and what do you think you are doing? He says, I am Billy Bob Barton from Texas A&M, fencing.

(Laughter)

I'm glad to see you laugh. We have needed a few laughs the last few days. We ask a question. Only you can answer it. I will try to develop this in a manner that I hope will be engaging.

In the closing weeks of '99 and the millennium, Leon Jaroff was asked, along with others, to write an editorial, Time magazine, about 25 years from now what will be the things we know. And Jaroff took alternative medicine, complementary medicine, the Dietary Supplement Act, the entire field to task and basically said it is baloney. There is no science.

Now I understood where he was coming from because, basically, when I was drug into this kicking and screaming in 1985, and the people that I have met and encountered since 1985, I think Leon Jaroff represented in his very negative essay the general opinion and attitude of establishment science because I was taught the same thing they were.

A little more enlightening, I think, and in keeping with hope, possibilities, was an interview in the Journal of the American Medical Association February 23, with Dr. Straus, who spoke this morning, Stephen Straus, the new head of the National Center for Complementary and Alternative Medicine.

He pointed out in this interview that you hear anecdotal reports, that you can stack anecdotal reports as high as you want to, and that is not science, and certainly not a basis for public policy or professional recommendations.

But if you get enough of them, though it doesn't say that in there, I think I will show you -- that you might lead to preliminary pilot studies to see if there is something there and embark on

larger studies. Actually, drug started studies in the phase II will do this in various designs to see if there are benefits versus toxicity, and move on to stringent, competent scientific studies.

He says where we are now with complementary medicine, I might add that from this point on, I hope to not use alternative medicine; I don't like the term. I like integrative.

We did very well with acute deficiencies in medicine. As I frequently tell people if I'm in an auto accident, I have got pneumonia, pylo-nephritis or something, for God's sakes, don't take me to a health food store. Take me to a hospital. We excel in acute deficiencies.

It is when you get into chronic deficiencies that we need to look for better things, and there is a frontier.

Now to further set the stage, one of the more common things, if this area has got something there, if it's so important, why haven't I heard about it before. And the area that we started out in, when we would try to present at meetings, I don't know whether saying "holding their nose" would be appropriate, but you could almost see it when we tried to tell them that carbohydrates had biological activity.

I can tell you at this point from Australia through Japan to the United States, Canada, England, South Africa, India, we're all taught in the area of medicine carbohydrates and sugars are burned for energy. End of sentence.

I hold in my hand from Switzerland for one reason, it is independent. Us guys down in Texas don't have much influence in Switzerland. This came out as a dedicated issue with 15 review articles in 1998. I want to read to you something. Now this might well be written in Greek or Latin for most scientists. It is the most complex reading, even though I have been in the field 15 years, that I have encountered.

But there is one paragraph on the back summarizing the contents that if you leave here you will be ahead of over 95 percent of people practicing medicine in this very day. I'm talking about veterinary medicine, human medicine, biological sciences.

Glycosylation, the adding of sugars, is the most common form of protein and lipid modification but its biological significance has long been underestimated. Now they are not talking about you worrying about that. They are talking about medical, biological sciences have long underestimated this.

The last decade, that is only ten years; has witnessed the relevant emergence of the concept of the sugar code of biological information. Indeed, the monosaccharides, meaning natural sugars, represent an alphabet of biological information, an alphabet of biological information. Remember those words; similar to amino acids and nucleic acids, meaning DNA and your chromosomes, but with unsurpassed coding capacity.

Now does unsurpassed mean more than in the genes, in the human genome, that is being broken that you read in the magazines about? Don't forget this, alphabetic biological information. You will see that again.

The first review article in this is by Nathan Sharon. I share this because I can't tell you how many people contact me directly. If this is so important, why haven't I read about it? They haven't been reading in the right places. It is not in the Sunday funnies.

This review points out back when we started that if you look at a Medline search worldwide for terms that relate to glycosylation of sugars, glycobiology, in the text, title, and key words, that in 1995 alone there were over 20,000 published journals in that one year.

That is why I made that wiseass statement about the funnies. It is there. But I assure you, if I hadn't been drug into this kicking and screaming and saying no back in 1985 and spent 15 years here, I wouldn't know any of these papers had been published.

There is another independent source of information about the importance of sugars other than being burned for energy. Surely you remember this, 1985, Annual Reviews of Biochemistry. It didn't quite make Book-of-the-Month Club. "Assembly of Asparagine-Linked Oligosaccharides". That means complex saccharides. Assembly, you know that word. Arginine-linked we just got through talking about.

What we have in here is what I call the Rosetta Stone for the biochemistry of the importance of nutrition, and particularly glyconutrition, in this article.

It took a while. I probably read this paper 20 times and worked with a graphic artist so we could put this together, and it took about five years. But along the outside, you have ultra structure, what you can see under an electron microscope. But you have essentially the blueprints in DNA and then you go to a workbench inside your cells, micro, micro, ultra- micro, where a working copy from DNA called RNA is pulled through like a row of -- a player piano roll to start the symphony of life and provide the instructions of how amino acids should be polymerized. To determine whether you are going to get skin, liver cells, hormones, cytokines.

The next assembly line step is in the endoplasmic reticulum. The third is in the Golgi. Now when I found this paper and read it and read it. And finally, we had been working several years because I didn't find it the year it came out. I didn't sleep for two days and nights when I found it because all of that research was based around why the aloe plant was being used for 5,000 years, every continent and every civilization right up through the modern era, and no one knew why.

We have found out that the active ingredient in the gel is chains of sugars, nanosugars, hooked together like pearls in a necklace in a very special way. This showed us right here in the second assembly line step after the amino acids are put together that nine molecules, and you see them in blue, of nano 6-phosphate are needed to start the synthesis of all of the glycoproteins and glycolipids, which means the structure, function, molecules of our body.

That is why for 5,000 years aloe has been used by the priests in the ancient temples, by shaman, witch doctors, grandmothers, and my mother in the kitchen when I grew up, right there. They tried it, and it worked, and they just kept doing it.

To enlarge that a little more and to emphasize something, this led us to finally realizing, despite the bias of our education and prejudices of our thoughts, that in the last step, there in the small type, seven additional saccharides were required to properly finish off the assembly of the structure function molecules.

Before we leave, because Dr. Lord mentioned about her patient with the hepatitis C, this little hook right here is important because that is the process where endonucleases, hydrolases, estrolases (?), lipases are made for armaments of our white cells because when a phagocytized

viruses or bacteria are used, they attack them and take them apart with enzymes made on this system, and that is the little hook going to the armamentarium of your leukocytes that allow hepatitis-C and other chronic infections to respond.

An alphabet of biologic information; here are the letters of the alphabet. Glucose, galactose, mannose, glucose, fucose, xylose, acetylglucosamine, acetylgalactosamine. As they go from the endoplasmic reticulum, you see finally here how cells of the body communicate. They hold together.

You have got trillions of cells. They have to be in harmony. And you have to send messages like cytokines, cell activators. We have got a hole over here, and there is an infection, or there is a growth here. Do something about it.

These sugars are changing these three chains to fit into as message molecules to carry instructions like tiny IBM cards. But also, the very structure of the mailbox in the membrane we call a receptor site is synthesizing this mail to fit, and allow that message to be done. If you don't have the letters of the alphabet, it doesn't work well.

Again, this is what got us starting, taking the aloe gel, finding out that it would work when it was fresh. If you set it at room temperature for a week, it wouldn't work. This was high pressure liquid chromatography. This was in regard to healing of wounds such as diabetic ulcers.

It didn't take a rocket scientist to say that if you found out when it set for a week and it wouldn't work and this peak disappeared, there might be something to do with it.

Well, we spent \$30 million trying to find out what this peak was. Thank God it was somebody else's money, trying to make a drug out of it. But we had a real problem. The FDA in phase I, and the way the laws were written at this time was that you had to tell them how much of this does it take to kill half the mice, rats, cats, and dogs, and how much to kill all of them. Our problem was, number one, we couldn't kill anything.

(Laughter)

Now you would think that would kick us in the head and say, dummies, it isn't a drug. But if you made a claim that it improved health, by legal definition it was a drug, so we kept trying. Very importantly, in 1994, the law was changed, and we had a place for our white powder that wouldn't kill anything. But number two was our problem, they said, what is your claim.

We started telling them all the things. And then there are some even today. There are no panaceas. That is another one of the dictums of medicine. Too many good things were happening. But it drove us out of the drug paradigm and eventually into nutrition.

Now Dr. Straus mentioned anecdotal reports. I'm just going to tell you exactly how this got started. I'm not giving you a New England Journal, every doctor ought to be doing this type thing. Uh-uh. We are far from being there.

A 43-year old male that worked in city government in our community came to the hospital in 1983 with chest pain. X-rays were taken.

I might add that my program crashed and it is not in my hard drive. So last night people were trying to get this through Kinko's. It could only take 5 megabytes, and I had 150 megabytes in one file. They are not as good as I would like in the time I spent to get you good stuff. But it shows you we have got it documented.

He was thrown back in the ambulance and taken over to Dallas, where they have a cardiac team. They thought he had a ruptured aortic aneurism. And this shows you a little bit more about from his thyroid gland down to his diaphragm, there was something in there. By arteriography, they found out it was a solid mass.

It was biopsied, and it was diagnosed as an embryonal sinus tract tumor. No survivors, despite any type of therapy.

We have the biopsy, which did not transmit. He was given multiple chemical agents and radiation in a sarcoma protocol. I don't know all of the -- I don't think it is important to give you all of the agents he used. But that was 16 years ago.

About five years after his health resolved, he came up to me at the Rotary Club and says, I had an experience I thought you might be interested in. I said, tell me about it, Wendell. He told me what I just told you. But there was a story behind the story. Because of people down in Texas do do aloe work, he had ulcerative colitis and his grandmother who lived there who was over 90 told him you ought to take aloe beverage or juice.

He did, and he helped his symptoms. The fact is, he had no symptoms as long as he took it regularly.

All through his chemotherapy, he took the same stuff for his ulcerative colitis to keep it under control while it was going through that.

Well, if that is all that ever happened, you and I wouldn't be looking at each other. But you don't forget someone coming up and telling you this.

The next thing is because of our efforts to try to make a drug out of this white powder, a lady from Connecticut showed up in my office one morning with tears in her eyes, only 38 years old, with two little stair step boys, saying, help me some way that I can raise these boys. She looked pregnant, but she wasn't pregnant. She had a ascites from breast cancer.

When she was 31, she had a 2 centimeter mass in her left breast. Modified radical section was performed. No lymph nodes were positive so she had no further treatment at that time.

She was negative for five years. In 1988, she had a plastic reconstruction of her breast. In 1989, at the age of 38, there were approximately 10 lytic bone lesions and her you see one of them in the symptoms. See this little black? Well, around her skeleton, she had about ten of those.

In addition, in her liver she had a 5 centimeter metastatic mass. If you will note here at the edge of the liver, there is a lot of black around here. That is the ascites. She looked pregnant.

Well, I told her to go back home. She had already failed one course of chemotherapy. I told her to go back, take this aloe juice, and try the treatment again. This time, it worked.

Just before they had started this, she had had a mass in the neck and this is a widely indifferntiated tumor that is stained by cytochemical stains like the original biopsy. It was breast and her neck. But after going through her therapy, there was no evidence -- that is not the right one. Where is it? Here it is.

This is the radiologist's grease mark. That is where that big tumor was before. If you'll notice, her liver is touching her ribs now. She doesn't look pregnant. She doesn't act pregnant.

During therapy this last time, instead of being sick and laying in bed, she swam every day, ate, and didn't have nausea and vomiting.

Remember that last year? All her lytic lesions in her bones were gone by the end of the year. Now this is over ten -- '82, you know. It is more than ten years. She has traveled the world, occasionally sends me a card when she is in China, Russia, the pyramids, the Valley of the Kings. Her two little boys have graduated from college, and one of them has married.

You do not know what gratification and satisfaction and pleasure can come from some small interactions with other human beings when you are a small part of potentially why they are still enjoying life.

The next patient was a nurse in our hospital's husband, 56 years old. He was having obstructive vomiting, sometimes with of blood in it. They scoped him. They found out he had a cancer of the enteral stomach. They took him to surgery. At the table, he had lymph nodes above, beyond implants on his peritoneal surface and metastatic tumor.

I was shocked at the end of the day when they had done a gastric resection. But they said because it was obstructive symptoms, at least he might have some palliation from that.

The nurse knew about one of the other cases, and so she insisted that while her husband took 5 FU, adriamycin and mitomycin on a rotating basis with a week off for a year, that he drink this stuff. He didn't even get any mucitis, fatigue. And at 13 months, they were so surprised when they did the gastrosophy. He was totally healed in the mucosa. They talked him into a look-back operation.

Where the lymph nodes had had obvious palpable and took some of them out, and we had sections which didn't transmit, but where they had peritoneal implants, we do get something that came through, fibrous tissue where he had had this, obvious gross implants. Same room, same surgery, same pathologist attending this. It begins to make you wonder if something good might be going on from these anecdotal reports.

Now this next case back in this sequence -- my phone rang, and it was a pediatrician I have known over 20 years, and he says, my brother is here, came by to tell me he is on the way to buy his urn for his ashes. Would you see him? And I said, why? His PSA was elevated, about 28, 38.

It went down after surgery, then it went up. It had radiation, went down, came up. They did hormonal castration, went down, came up. They did surgical castration. PSA went down, came up and then in his chest X-ray, he had nodules, and then they did the scan. I'll only show you two. Here is along the pleural surface. Multiple -- over 100 nodules of metastatic adenocarcinoma.

There are over lung cuts, but I think anyone can see, so many, so small, they thought it must be tuberculosis. They biopsied it. They did the brown stains, adenocarcinoma with the prostate specific antigen, prostate stained positive.

He received agents that never worked for this tumor in combination with large amounts of the polymannose. The first time I saw him, I had seen people I had done autopsies on that looked in a hell of a lot better shape.

At the end of a year, he had no nodules in his lungs. Here is another one. He had returned to playing competitive tennis in his age group. Two years ago, he won the Texas table tennis championship for his age group. If he lives to February 2001, it will be ten years since he was sent home to make his funeral plans.

That just anecdotal. Of course, we take people's freedom away from them and put them in prison on anecdotal testimony. You get enough anecdotal. How in the world can this be happening?

Well, with the help of Galen Marshall, head of immunology -- Galen Marshall, head of immunology, at the University of Texas Health Science Center, we did at least assays doing -- putting zero as the control, you see here, 1, 10, 100,000 micrograms of this single glyconutrient, what I showed you needed 9 molecules of in the endoplasmic reticulum.

This is an increase in IL-1 in a dose response basis, IL-2, IL-6, tumor necrosis factor, macrophage colony factors, interferon-gamma. Alpha-interferon it did not influence. These are the pro-inflammatory cytokines the body used for innate defense against not only tumor cells, but virus infected cells.

The next thing we did is we found out a researcher. Since we didn't have much money, we kept trying to find somebody that had a grant looking for something and needed something to justify their existence, but they had money. That's how you do it when you don't have any.

And now at Texas A&M, a former NIH investigator had a \$2 million grant for several years to look for anticancer substances. One of the members on our team was on the adjunct faculty, was trying to, because of these cases that I showed you here, get him interested in looking at this and seeing if there is something there. He was not interested.

If you think going to medical school makes you arrogant and know everything, you should know a former NIH clinical investigator. They know more than anybody that went to medical school.

When he found out it was a carbohydrate, he says, get out of my office, and don't come back again. I don't want to ever see or hear of this.

So we scraped up the money and gave an unrestricted small grant to the dean of the School of Veterinary Medicine, and at the reception asked him to have Dr. Busby (?) test this. When they brought in the vial that he was very aware of and had seen before, to quote him now, he says, I was not amused, that his boss now was asking him to test it.

As the story will go, you invent -- he went to this thing, and he got Norman sarcoma. And the reason he got Norman sarcoma, because he said, I want to teach those wiseasses in Dallas something, not to mess with me. Norman sarcoma has 100 percent death rate and no treatment has ever altered the 100 percent rate of mortality. That's why he chose it.

As luck would have it, he had the graduate students inject the peritoneal cavity one time with 1 milligram per kilogram, and he went on vacation, went to Europe to a meeting, long holidays. About a month later, he came back, over a month, and all the controls were dead, and all of the animals that got one injection of polymannose were alive. It kind of got his attention.

He said, let them continue to go. And out here about 2 months, 40 percent of the animals had destroyed all evidence of the Norman sarcoma, couldn't tell they had ever had it. He said there is something wrong with the way this was done. He reinjected them personally rather than have a graduate student, twice as much as Norman sarcoma, and nothing happened, not even a pimple.

Now he was really puzzled.

AUDIENCE MEMBER: ———.

DR. MCDANIEL: I will show you that in a minute. Yes, they did. I said 60 percent of the test animals died, 40 percent destroyed all evidence. The Norman sarcoma is a very wild tumor. There is probably 10 or 15 mitosis in this. This is intracostal muscle here, a wild tumor.

When you have injected this, one of the first things you see is intracellular edema, and then interstitial edema, and then you see polymorphonuclear leucocytes were wandering in. Then you see microphages. Then you start to see islands of necrosis. And finally, on high power, you will see total necrosis of the tumor with tumor dying here at the edge, suggesting an activation of the innate system here.

I hope this explains your question. Norman sarcoma, 100 percent death rate. The first experiment, 60 percent of the animals eventually died. All of the controls died. This is a more purified, the yellow dots, trying to at that point conform to FDA, identify, purify. This is very crude, and I would say nutritional grade extract.

AUDIENCE MEMBER: Oh, was that given by injection?

DR. MCDANIEL: Yes, IP. You can't get mice to tell you how much they are drinking each day. You even do this with vitamin assays.

With an injection weekly rather than one with the single sugar in the alphabet, we finally raise it rather than just one injection to 52 percent survival. When we finally realized the whole alphabet that I showed you and put it together from natural sources, run in parallel 67 percent survival, by giving the whole alphabet rather than just one component.

It also suggests there are other things that might be missing from the diet or the alphabet to improve the survival.

The next step we went is that natural killer cells carry out cytolysis is part of the normal physiology to destroy tumor cells or virus infected cells. So Dr. Dr. Galen, down in Houston, Marshall, did a four hour natural killer cell functional assay.

The controls are here. These are human leukocytes that are -- this slide did not totally transmit. This is with 1, 10, and 100 micrograms of the single sugar. You see the increase in lysis of the

target cells, increased in vitro human cells incubated overnight with this amount and then put on -- the cell line had been seeded with herpes.

Well, that is in the laboratory. When you don't have money, and with managed care, it is hard to get esoteric tests in this day and time, almost impossible. But a doctor in California was aware of this and developed squamous cell carcinoma on the base of his tongue. He had access because of his research to the natural killer cells on himself.

In July 1998, he had the tumor resected from the base of his tongue, and his natural killer cell assay was about 528. Then in November, 320,899, and then he started taking the glyconutrients. You can see that the highest it has been is 85,045, taking it orally.

I might add that this gentleman was not taking the single sugar. He was taking the total alphabet, or eight saccharides.

Last year, Dr. Glen Hyland, trained at the Mayo Clinic as an oncologist, presented 100 cases that he had gathered from three states. If you would like a copy of this abstract he presented, it is in the thing over there where you can get it from the Fisher Institute.

But one of the most important things that he mentioned in here was what suggested was a differential effect.

I have never seen squamous cell carcinoma shrink so completely, so fast under my standard therapy, while at the same time their platelets, their anemia, their white cell count does not collapse. It is like the normal cells are protected, and the abnormal cells are made more sensitive to treatment.

Now some of you are beginning to look at little glazed over. Let me speak to you all in Texan. You kill the bad'uns, and you protect the good'uns. Got it?

So we went looking for how could this be possible. One night I walked and I said, normal cells carry on good housekeeping; malignant cells grow. I spent a year reading, trying to figure out what that meant. Finally, it meant to me that the number one good housekeeping molecule inside the cell is reduced glutathione. It contributes electrons to keep vitamin E fat soluble, vitamin C water soluble, superoxide dismutase in and around the mitochondria, all in the protective state, as well as itself in the water soluble, being protective.

Chemotherapy or radiation generates free radicals to kill cells. This molecule supports the anti, or the anti-free radical, or is the antioxidant system that is natural inside the cell. The Russians call free radical damage and oxidative stress the rusting diseases of human beings.

This is your anti-rust systems because the greatest source of free radicals and reactive oxygen pairs are from your own mitochondria. Fortunately, we come equipped.

So possibly -- we took liver cells and this says a meridian cell scanner -- there is a 1,000 scanner cells living with a fluorescent molecule that tells you where there is reduced glutathione that can contribute to protection of the normal cell, good housekeeping, and machine units -- this is the level at 300 seconds of intracellular protective reduced glutathione.

In 300 seconds, when you add 50 micrograms, you increase the protection 50 percent. Now you can challenge this with an organic oxidizer, and you'll see that normal controls just collapse and give you almost virtually no protection. But the controls you still have about 50 percent.

This is a potential mechanism to give the differential effect of why the patients do not have nausea, vomiting, damage to their bone marrow. It hasn't been proven, but it is a rational basis.

Now I keep the hitting on -- because I guess I am so close to Washington and the source of all funds, it seems like, for research, that I keep harping on the shortage of research funds for this type of work because I'm generally regarded as your visiting heretic, and I realize that. But I have asked people in the most cynical voice, what would it take for the least amount of effort to show you something that would mean something in the terms of pilot patients or anecdotal patients that would say this was worthy of looking at further. They said show us some pancreatic cancers, inoperable pancreatic cancers.

So I do not have -- and it is typical in a medical family. My mother had sinus problems with arteriograms, and all of the studies disappeared for a year, and all of a sudden they could find them. It seemed like that is the way it happened.

But this physician's wife had a 20 year history of chronic pancreatitis with bouts of severe episodic pain and elevated amylases and lipases.

In July '98, she experienced rapid weight loss, from 135 down to 90 pounds in less than six months duration, with constant, terrible back pain. They lived in the north region of British Columbia, and the records and the patients travel a great distance for medical diagnosis, and medical file, and the studies are not currently available.

The husband is a physician. He has reviewed all of these records and studies with multiple specialists.

In July '98, scans were done of the abdomen, and several masses at the head of the pancreas and liver were demonstrated. The ductile system in the pancreas and liver were dilated, and the laboratory results reflected this status.

Since she was not a surgery candidate, her husband started her on Esiac tea and dietary supplements containing the glyconutrients we have mentioned, the full alphabet, phytonutrients, free radical standards and antioxidants of vegetable origin that more and more work is being done on, and phytoestrogens from the Mexican yam.

Her pain slowly eliminated, weight was restored, fatigue reduced, her appetite returned, and her jaundice cleared. The studies were repeated one year later, by her husband there. The ducts were no longer dilated. The mass was no longer in the pancreas. The liver metastasis were no longer detectable and the greatest benefit they claim is the first time she has had two years without a chronic pancreatitis and been out of pain.

Now that and 50 cents will get you a cup of coffee in some places and I wouldn't even read it to you if it weren't for these next two. This is gentleman at the age of 80.

AUDIENCE MEMBER: _____.

DR. MCDANIEL: Phytonutrients, the 12 plant matured fruits and vegetables flash-dried to save antioxidants and free radical standards that a lot of work has been done on.

This is a gentleman that developed jaundice, abdominal pain, lost about 30 pounds in less than 6 months, and terrible fatigue. His bile duct, common bile duct, you can see here and the next thing they did -- this was at a peripheral hospital, but a good one. You cut down a little further in it, and he had masses around the head of the pancreas and up into his liver.

So that doesn't look good. Those could be cysts. They put the gastroscopy up his pancreatic duct. And this is from own self here, how orderly and nice they look, size, nuclei and all, and they you had sheets of cells like this, which I will show you a little later. I think that you don't have to have a pathology residence to say one looks organized, and one doesn't, jumbled, if you want the word.

If you look closer at this, you'll find a lot of chromosomes stacked here. Here is a tripolar, if not quadripolar, mitosis. Here is where they have normal mitosis. Here, the chromosomes are not supposed to line up like that. Aggressive pathologists say this is cancer of the pancreas. A cautious pathologist says it is abnormal, cannot rule out malignancy.

He was transferred to Baylor Hospital, the most prestigious hospital in our area, fine people. They reviewed all of this, repeated all of the studies. They said, Tom, you have got pancreatic cancer, about six months to live. We can treat you, and you'll be miserable every day, and you'll live six months. Or we can do nothing and you might have some good days. Which do you want to do and he elected to do nothing.

But because somebody knew somebody who knew somebody, he called my office and started taking the dietary supplements. His jaundice cleared. His pain went away. He gained weight. His energy came back. At six months, he went back to the big hospital. They repeated his studies. Sorry, they didn't transmit.

They said, Tom, it is some kind of miracle. The masses in your liver are gone. The ducts are no longer distended and that has been over two and a half years ago. He has returned to his passion in life, ballroom dancing, has built a mansion with a place for an orchestra and 150 people to dance at one time and every time I see him, he looks younger, even though he is 83 now.

I say, how are things going? He says, I'm having to get younger and younger partners. At about 1:00 or 2:00 in the morning, when I start to do the bossa nova and the samba, they can't keep up with me. Pretty good for a guy sent home for his funeral.

Third case, 38 year old oncology nurse with over 20 years experience developed pain, jaundice. They began to work her up, and they found out she had an 8 centimeter mass in the pancreas, and they did a Whipple's (?) resection. This is from the Whipple's, a capillary cystic adenocarcinoma of the pancreas.

They found out she had liver metastasis, and they did with sections of her liver and in her liver was the same tumor.

They re-resected her liver. More tumor masses came back. She had vinyl alcohol infusions, and then she started to add to her diet the alphabet that the body needs to write its own prescriptions, might be the way to look at it. She has been having at two month intervals -- and

you'll just follow that one, one, two, three. The radiologist measured those arrows and say they are getting shorter.

Here is another series, one, two -- they are not worth looking at anyway. It is just there is -- I just want you to know it is documented. She has had just last week another set, and they say the arrows are getting shorter. But her pain is gone. Her jaundice is gone. Her weight -- I saw her in Orlando, Florida. She flew down there with her 80 year old mother.

She was put on hospice three years ago with three to six months to live and her mother moved in with her and happened to know about our stuff, and literally put it in her feeding tube. She could not get out of bed, couldn't even go to the bathroom and now she can dance with you.

The only thing that I want to make a few practical comments now, you know more about this than you think you do. I cannot prove you about vine ripened tomatoes versus green picked, shipped across the country. You buy them, you bite in them, and it is tasteless red mush. I could not convince you that there isn't something different than if there is not something missing.

You're right. Harvard Medical School says there are over 300 plant synthesized molecules that are missing. Just one of them is lycopene. Two major functions in humans that we know of, it is an antioxidant, a very special antioxidant that has an affinity for the rods and cones in the retina. If you had a lot of lycopene in your diet over your lifetime, you have a reduced (?) incidence of molecular degeneration.

But it has another function. In the human marrow, Harvard tells us, it is active in DNA audit and repair in the glandular cells of the prostate.

Those molecules that you can detect and you know are missing from or food chain now that we have plowed up our gardens, chopped down our orchards, and these molecules are missing. We are beginning to see that there are many health consequences that we would not know if that had not had happened.

I have mentioned before the Dietary Supplement Act of '94. We would never have had the freedom to use these as foods, and we have been restricted to try to. I always think of -- and we go through the very arduous and expensive process of a drug type approach.

In that law, it says _____ (?) reduce the country's health care expenses. We have another dimension of this. If we had been successful in getting the single sugar that we sought to make a drug as a drug, I guarantee you today it would be selling for somewhere between \$10 to \$15 a capsule or tablet, no less, because that lifesaving drug Viagra came out at \$12. So certainly this would get somewhere in that range. It is available today in bulk for 15 cents as a dietary supplement for the same amount of material that would have been in that capsule or tablet.

1971, a gentleman that I call the patron saint for scientific nutrition, wrote the book, one of ten books on nutrition that he wrote, Nutrition Against Disease, with over 1,000 peer reviewed journal articles. He wrote, "The human heals itself using resources provided in nutrition," 1971.

Every time we think we have got somewhere that maybe we ought to put a thumb under our suspenders and strut and say how smart I am, we look on the mountain of ignorance we are standing on, and we find somebody else's name deeply etched into the stone with lichens and evidence of cracks of many freefall cycles.

Before him, Paracelsus in the Dark Ages, the father of pharmacology, wrote, "All man needs for help in healing has been provided by God and nature. The challenge of science is to find it." Kind of hard to get ahead of both of them, isn't it?

But before him, Hippocrates, the father of western medicine, wrote, "Let your food be your medicine and your medicine your food." But he was a little slow on the uptake. In manuscripts that date back nearly 5,000 years in the Torah, Genesis 1:29, it says, "And I give you the plants and seed bearing plants and herbs, and for you it shall be meat." Hebrew scholars tell me that is great prose for 1611 England. But a better translation is "sustenance," for a literal meaning. Five thousand years ago.

I'd like to close with a thought that Max Planck, who died about 1942 or 3, said, "New science is never brought to the public or the world by the establishment, that you have to wait for funerals, and it is the new generation that brings the new science forward." I hope we can change it, but I already see evidence that I'm too old.

I was given this. Ashashwam (?) took the complete alphabet, and has now won in science fair projects -- showing that PC-12, in a cell to cell adhesion molecule is increased on a dose response basis in cells quantitatively by adding this to the media and she has won a college scholarship.

I communicated with her and told her about the mouse metastasis models with melanoma. They are reduced, and that probably this is the mechanism that she is showing.

So the youth will carry the torch further, as I fall. Thank you.

(Applause)

DR. LORD: Thank you very much, Reg. I just want to make sure that the laypeople in the audience understand the basic mechanism. Did everybody understand what we are talking about, the science of this? This is really about cellular --

DR. MCDANIEL: Well, if you do, you are ahead of me.

DR. LORD: I just want to make sure people understand the basic concept of what we are talking about. I'm going to say it, and then Reg can correct me. But the basic premise is that we are supplying essential sugars, which are the molecules of communication so that cells can communicate with cells better.

The reason it seems to help with so many conditions, even other than cancer, is that this the communication between all of our basic systems. So it is really intervening on the lowest part of the pyramid so it can affect all of the different cells talking to each other in different organs. Is that --

DR. MCDANIEL: Let me try at this because human beings and communicating, we usually do it with our eyes or our voices. But cells don't have eyes or voices. But we could work up a system that one finger, and you felt of it, meant safety. Two fingers meant let's get out of here; three, danger and is more like braille, except that is just an analogy.

It has got three dimensions. It has got charge for these things to hook together and to be able to proper -- and that's why the sugars are so important is you could see by the lectin-lectin binding and protein-lectin binding that is described in here.

DR. LORD: So if there is some invasion of something bad, your body has to be able to recognize it and give the right messages to the right organ systems to make everything happen as it should. With our diet process the way it is, it appears that we are missing some of these building blocks of communication, and that these supplements are restoring that.

Okay. Thank you very much. I'm looking forward to hearing what Dr. Nixon has to report back to us. DR. NIXON: An awful lot of stuff to take in at one time. We'll try to do this -- oh, by the way, you left out one important thing. Did Billie Bob get in?

(Laughter)

DR. MCDANIEL: I hope so.

DR. NIXON: We'll use the call and response technique here that we use in the South sometimes. I have got some questions for you, but I want to -- maybe those questions will help clarify some things that I had some questions about as we went through.

Let me put on my clinical oncology hat first and go straight to some of the questions, particularly about these two last pancreatic cases. What exactly did they take? You said they took an alphabet, but what was it that you gave them?

DR. MCDANIEL: I didn't give them. They did it on their own. In fact, it was an 80 year old mother gave her, I believe, about six teaspoons a day of bulk ambertose, which is the sixth -- pardon me, the eighth simple saccharides, plus the phytonutrients that are 12 plant materials, fruits and vegetables freeze-dried, and then the Mexican yam, which contains the plant sterols that are glycosylated and have to be deglycosylated to even be absorbed.

DR. NIXON: Mm-hmm. So it was a mixture.

DR. MCDANIEL: Absolutely.

DR. NIXON: It was not the aloe compound by itself. Okay. That's helpful. That was in both cases?

DR. MCDANIEL: Yes.

DR. NIXON: Okay. That brings up a comment about whole foods, and you have quoted the Bible. Let me give you one more example. After the flood, God said, I saved these animals for you. I have flood and drowned everybody else. But I'm still a little bit mad at you, so go ahead and eat meat.

That illustrates, I think, quite nicely what may have gone wrong in the modern world with too much fat and too much obesity, not enough emphasis on the whole foods, which is part of the message I think I am getting from you is that whole foods are important, whole foods, whole vegetables, perhaps with supplementation of some of the important constituents of whole foods.

Am I reading you correctly there?

DR. MCDANIEL: Yes. And even further that because we can't be original. There has been too many before us. Dr. Williams has one illustration in his book, and it is a chain that goes around on a tabletop and it begins to rise up like a snake going to bite and he says, that's our food chain and at every link is an important nutrient.

Those we know and even those we don't know about, if anything is missing, it becomes that link, and it drops down, and we have either fatigue, lassitude, compromise in immunity, or illness, and that that is where medical science has been wrong.

They have always tried to purify and isolate and test one thing, and that in nutrition, as you are saying, complete nutrition is whole food, I think is your code word.

DR. NIXON: Right.

DR. MCDANIEL: Yes, sir.

DR. NIXON: All right. Now let me put on my researcher hat, and we'll talk about a little bit of history in glyconutrients and how I might suggest that you proceed in your attempt to demonstrate the clinical effects of these compounds.

Glycoproteins are ubiquitous in the body. He said that. There has been research in glycoproteins now for almost 100 years. I have had a particular interest in this a long time before I heard of this symposium and this product. But there was something called a seromucoid of Remington. That was a compound found in the circulation of cancer patients back in the 1920s that Dr. Remington demonstrated had some pretty profound immunosuppressive properties.

So the cancer cell and the body's response to the cancer cell produces large amounts of these circulating things in the blood. CEA is one, is a glycoprotein, carcinoembryonic antigen that colon cancer patients make. PSA that prostate cancer cells make is another one.

We are now just beginning to sort out how these hitherto mysterious compounds actually kind of mess up things in the cancer patient.

Why are they there? The theory that I like the best about the presence of these compounds is that the cancer cell produces these glycoprotein things on their cell surface as a protective mechanism to protect the cell against the body's defense mechanism.

By the luck of the draw, some of these cells, the bad cells, make the right kind of protective armor, and some don't. We all make cancer cells probably all the time, and the body's defense mechanisms can get rid of those cells. Those that happen to make these glycoproteins survive and grow, and grow into a tumor.

DR. MCDANIEL: Now you presented some very interesting data about production of cytokines after exposure to the chemicals of these sugars. What might be happening, and I propose this as a hypothesis for your work, is that in the cancer patient, these simple or complex, as it might be, sugars could be, in this three dimensional model you are talking about, acting almost like a blocker of a receptor so that the bad glycoproteins made by the cancer cell still have to work, and then you release the cytokine, the immune defense mechanism of the body and that could be very easily tested in animals. And I would suggest that would be one thing you ought to look at.

DR. MCDANIEL: I would say that you are beyond hypothesis. It has already been shown that microphage inhibitory factor (?), as we put this milieu together, that the tumor cells will make cells that can be transferred from the patient cells to donors, and their cells are inhibited and won't wander and keep them from coming toward a cancer.

This is a common thing. Cohan (?), I believe his name was, from NYU has worked primarily his life on adenoviruses, and the viruses do the same time of mechanisms to block the immune system from telling which cells are virus inhibitive.

DR. NIXON: Okay. Well, that --

DR. MCDANIEL: It is a common denominator.

DR. NIXON: That fits that hypothesis quite nicely.

DR. MCDANIEL: Yes.

DR. NIXON: Okay. Then I would propose, after you have demonstrated some clinical, some effect in animals or in the test tube, that these cytokines are manipulated, and you have got data, that you then proceed into a clinical study.

The first step would be metabolism, what is the proper dose, how much of these things are absorbed, does the cancer patient absorb more or less. We did this with our raspberry project and found, much to my surprise, that human beings, in contrast to animals, absorb a lot of a particular chemical called ellagic acid, which in animals, they don't absorb very much.

So I would use the human normal volunteer as the next step, give them some of the compound, draw their blood, and you'll see how much is there. Then take that back to the lab and test the cytokine, that amount, the cytokine manipulation effect, and also look at another phenomenon that seems to be now almost a final common pathway for these thousands of phytonutrients, phytochemicals that we are looking at, and that is apoptosis that program cell death.

Cancer cells forget how to die and a lot of these chemicals in fruits and vegetables re-establish the apoptotic mechanism. They allow cells to live and die normal lifespans, in contrast to what cancer cells do.

So I would look at that as well. Then after you have figured out a plausible mechanism, I think you have got a really good shot at an NCCAM grant. I would go after that big time because I think you have got something very interesting here.

DR. MCDANIEL: Are you on the review panel?

DR. NIXON: No, I'm not. But I -- yeah. So go after one of these guys. Or the NCI has a young investigator mechanism that also has some very interesting small grants for these kinds of innovative ideas. So there are ways to get money for these bright ideas that you have got. Test them and see if it has clinical effects because I believe that if we can parse out the chemicals that in our foods and in nature, and then give a dietary prescription for these things, for an individual cancer patient, that is really the way we ought to go. You are getting there, and I would encourage you to keep going.

A final comment before we throw it open to some questions. Okay. We're about out of time. The comment that you made about lycopene and some of these other chemicals, a lot of the phytonutrients are not pure sugars. They are sugars combined with other things. I'd get me a botanist and I would try to figure out exactly what is in the aloe and what is in tomatoes. They may have a very similar effect so that you could build one thing upon another and have a combination of effects because it is probably going to just be the aloe by itself. It is going to be a mixture of stuff that is going to really attack cancer.

You might want to start by looking not at the end stage of the disease, because that is asking a lot of any kind of treatment, conventional or not. So you might want to look at intermediate markers like polyps or leukoplathia in the mouth or something like that as a first step.

DR. MCDANIEL: We have seen reversal of even severe dysplasia of the cervix by topical application.

DR. NIXON: That's important.

DR. MCDANIEL: And also in tobacco-induced -- in fact, I even thought about going and getting a tobacco grant, but I don't know whether I can drop or stoop to that or not.

DR. NIXON: Yeah. I don't know. Money is money, just for research.

DR. MCDANIEL: We can reverse the premalignant changes in the mouth and tongue induced by tobacco.

DR. NIXON: Okay. Well, my final comment is there is a lot of excitement and a lot of good stuff to be found here, and you are well on the way, I think, to figuring all this out.

DR. MCDANIEL: Well, we're not any more by ourselves by any means. There is just a lot of people. The time is coming. I was shocked when I first met you and thought you were working with raspberries. It is just the time has come. Truth can only be lost or suppressed for so long.

DR. NIXON: Okay.

DR. MCDANIEL: That's what we are talking about has been here since the beginning.

DR. NIXON: That's right. So let me turn it back over to Dr. Lord, the moderator.

(Applause)

DR. LORD: I'd like to open up the floor to questions. We have a microphone set up. If you would like to speak into the microphone, then we can record your questions.

AUDIENCE MEMBER: I'm a medical oncologist. I also do complementary types of medicine with a lot of spiritual and prayer and some nutritional things. There is a doctor in my community. I think you know Dr. Nichols, Trent Nichols (?) probably, who I work together with in patients who express an interest in alternative or complementary nutritional things. He often recommends a variety of different compounds in consultation with him.

I find it a little bit disconcerting -- and I thought your talk was good. I find it disconcerting to hear this whole talk, listen to the case studies, and not know what the patients got. Then when Dr.

Nixon asked what did they get, I still don't know. I'm going back to my community to treat people with pancreatic cancer, and I'm going to offer them some standard chemotherapies, which we all now are of limited benefit.

I wouldn't say that I think studies have shown that the quality of life is actually better with some of the chemotherapies despite their limited benefits and supportive care alone.

Occasionally, we do see shrinkages of tumor. Some people like to get the chemotherapy. Some people do not. We give supportive care, and we offer people these other modalities, and we offer them a choice.

But I would just say as a question/comment, I haven't heard anything here that I could go home and offer my patients. I don't even know what these people got from your presentation.

DR. MCDANIEL: That's a good point. But I didn't come to make a commercial and the fact is, I feel like it would be discrediting to our research to give you a commercial.

AUDIENCE MEMBER: I don't want a commercial.

DR. MCDANIEL: Yeah.

AUDIENCE MEMBER: But just give me a case presentation. A case presentation should tell me exactly what the patient got.

DR. MCDANIEL: I would say that number one, we don't know all of the things that they got. I didn't know for years that --

AUDIENCE MEMBER: ——

DR. LORD: Excuse me.

DR. MCDANIEL: If you waited for years that you didn't know there were 300 phytochemicals you were tasting the difference of in tomatoes. You liked them, and you ate them, and it was good.

AUDIENCE MEMBER: Not the point.

DR. LORD: I would like to clarify the question. You say you don't know what the patient has. Are you talking about diagnosis or what they are taking?

AUDIENCE MEMBER: No, no. As a case presentation, as people with incurable cancer got something and did well. We need to know what exactly they got. What did you give your patient exactly that did so well?

DR. LORD: As far as I know, there is only one company that has found a way to process aloe in a way that the natural enzymes in the aloe plant do not destroy the active ingredients. That is my understanding. There is one company that makes it. The name of that company is Mannatech, and they make these products. That is what I gave my patients, yes.

AUDIENCE MEMBER: What did you give your patient, a Mannatech product?

DR. LORD: Yes. There are several of them.

AUDIENCE MEMBER: What exactly did you give your patients?.

DR. LORD: It depends on the seriousness of the illness. If someone is in reasonably good health, with minor health problems, the dose is lower. With cancer, we go up to approximately anywhere from 3 tablespoons a day. I'm not -- I'm going to leave that protocol. I have ways that I evaluate patients to determine that the doses that I use -- there are doses that are recommended by the company that seem to help cancer patients.

If you feel comfortable, Reg, talking about that. These products are available, and I will say that there is a Mannatech group in the exhibit hall, and you are most welcome to get more information there.

AUDIENCE MEMBER: Why can't we hear it at the seminar?.

DR. LORD: I'm not quite sure why you are so angry. We are more than happy to answer your questions.

AUDIENCE MEMBER: I think a lot of people in this whole conference are angry because they are not getting specifics. They are --

DR. LORD: We will give you the specifics.

DR. MCDANIEL: If we had all of the answers, we wouldn't be having this conference looking for, you know --

AUDIENCE MEMBER: I don't want to know the answers. You presented a couple of cases. I would like a simple answer, what exactly did the cases you presented. Even though you presented a case, and we don't know what they got, that is pretty poor.

DR. MCDANIEL: I'll admit to you, and I'll also say I have got --

AUDIENCE MEMBER: ——— It is not acceptable to come to a conference and say it didn't get loaded on my computer.

MALE SPEAKER: There are other questions.

DR. LORD: Yeah. Perhaps we could talk about this after -- yes, please.

AUDIENCE MEMBER: I'm a nutritionist and a registered dietician at George Washington University Center for Integrative Medicine. I am very interested in this subject, and it is a subject about which I have read very little in the scientific literature.

I have a very open mind about it. I'm in a position to synthesize whatever information there is and then interpret that to others in my professional community, and I would love to be able to research this as well with cancer patients whom I counsel.

A product such as the one that you describe, the Mannatech company, of course, that is something that can be easily marketed, and there is a formula for that. On the other hand, General Foods, that I believe, as I understand, are also sources of the same sugar compounds,

perhaps in different proportions, but there are also sources of these essential sugars, fruits and vegetables and so forth that people can eat in greater quantities.

It is not as easy for a nutritionist to encourage a patient or just the general public to eat more fruits and vegetables as it is to just buy a marketable supplement.

So I can understand the conflict of interest that may arise, you know, as you have identified a product and you are hesitant to sound like you are promoting the product. But I am interested in knowing more specifically what went into the product, and how is it different from just the kinds of fruits and vegetables that we all have access to.

This is the gray area that we are all looking for.

DR. LORD: Sure. It is a great question.

DR. MCDANIEL: Well, one of the big problems is there are parking lots and condos and things where we used to have gardens and orchards, and plants are harvested green off in the distance. We are finding more and more molecules that are not turned on and made -- the genes are not turned on in the plants until the fruit or the seed, in particular the seed, begins to mature.

They are in the plant for a purpose. They laminate around the seed so that this dead-looking, dry, tiny seed can go a season or several years in more and more soil, and that embryo comes to life, and you have new life.

It just so happens, apparently, our cells require thousands of yet to be identified molecules that are all through nature. We don't know all of them, and we don't know all of them in any one plant.

Furthermore, we have found out with our phytoenes that depending on the time of the year, the amounts are in there that plants have bindable testosterone that is not testosterone, but it is bindable in estrogen and progesterone at different times of the year, depending on whether they are flowering, whether they are fruiting, or whether they are growing their leaves.

So the plants are in a constant dynamic change. A plant nutritionist came to me recently and gave me the data that the plants have all of the diseases that we are seeing in modern things like chronic fatigue syndrome comparable to people having a yeast or candida infections and hepatitis-C because the soil doesn't have the germanium, the iridium, and other trace metals that it takes to make the defensive molecules that are equivalent to our interferons and interleukins in the plant. Apparently those are of value to us when they are ____(?).

Do you see how complex the ecology of food, that you say these are in a bottle, and I'm eating fruits and vegetables, seven a day out of the market. But you know that the green picked tomatoes are not the same as the vine ripe tomatoes. This is repeated over and over again.

AUDIENCE MEMBER: What you are also saying then is there is a strong argument to encourage people to grow things locally, maybe organically. I don't know if I can read that into what you are saying but that there are measurable differences in the composition of fruits and vegetables, depending on how long they are grown, you know, when they are picked, and this kind of thing.

DR. LORD: I think the other thing is that we have genetically engineered a lot of our food with hybridization over the years. We probably don't know the kinds of changes we have made from food 100 years ago.

Thank you. That is a very interesting question. Please.

AUDIENCE MEMBER: I might also add that probably patient to patient, it depends on their general health and how they have been eating their entire life. If they have been brought up by mothers who give them whole foods, their nutritional status will probably be quite good.

If they have minor problems, very small doses of these can be helpful. For someone who has not eaten well for a long time, they be very, very depleted in these substances, and it may take very high doses to actually sort of saturate the body and get them well again.

We do find that in an acute situation, where someone is quite ill, the doses could be quite high. But as they get better, we reduce them down to maintenance doses.

DR. LORD: We're going to have to close, I'm afraid.

(Whereupon, the PROCEEDINGS were adjourned.)

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