Comprehensive Cancer Care: Integrating Complementary & Alternative Therapies
Diet and Cancer: An Overview
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Dr. Lord: I am a doctor in family practice. I use body-mind techniques, nutrition, psychotherapy and stress management skills almost exclusively in my practice. Nutrition is probably the single most important thing that I do with my patients. All the great traditions in the world have understood the importance of nutrition and the connection between the foods that we eat and illness or health. For example, the Ayurvedic traditions and the Chinese traditions have very complex and specific uses of food to balance the system. Even in our Western tradition Hippocrates said, "Let food be your medicine and medicine be your food."

For many years nutrition was the centerpiece of healing. Over the course of the last 50 years, that has changed for a variety of reasons. Nutrition is coming back, but it's considered alternative medicine, which is very amusing. The only way I can explain that is that anything we didn't learn in medical school is considered alternative. We certainly did not learn anything about nutrition in medical school.

Things are changing now for a variety of reasons. One is that there is such an increased incidence of chronic diseases. People are taking a greater interest in preventing conditions. They're not getting the kinds of results they would like from Western traditions, so they're looking elsewhere. Nutrition is one of the areas in which we can intervene with everyone. We all have to eat. It doesn't take anyone to help us once we get started and learn what foods are good for us.

There is so much obesity. We have so much food, if I can call it that. Yet people are malnourished and overweight, and all of these people are trying to learn how to come back into

balance. There's a tremendous amount of literature, books, and personalities who are promoting information. It's very hard to sort all of it out. Everybody seems to have the answer. A lot of the material out there is very interesting, and can be very helpful to a variety of people. However, anybody who says that they have the one right diet for everybody is probably not on track. People who are not in the health care profession are feeling intuitively that food is really important. As we become more and more aware, as we start using body-mind techniques and become aware of how we feel when we eat, we become aware that we often don't feel well. This is a great motivator.

Doctors never seem to develop that awareness. I know many gastrointestinal doctors who still think it doesn't matter what you eat even if you have gastrointestinal problems. The public is really leading the way, saying we want to know more about these things. Up until recently, the conventional wisdom has been that if we eat a variety of foods we're going to get everything that we need.

There are several reasons why we might question this. One is that we have poisoned our foods. We've poisoned the land. We use so many herbicides and pesticides and antibiotics and steroids when we grow our food that in general it's hard to find safe food. We know a lot about the effects of some of these things, but a lot of us are in a bit of denial about the harmful effects of all of these poisons, especially when you look at a diet over the course of a day. We're getting between 30 to 50 different chemicals in our body at once, and we can only guess at what the synergistic effect of that is. Our soil is depleted. We've been using artificial fertilizers for a long time, so the foods that we do grow are not whole foods in the true sense of the word. They are depleted in certain minerals and vitamins.

And, of course, there's food processing. We tend to change foods so much that there's not very much left in it. There have been studies done by the government that show that quite a sizable minority of people are not even getting the RDA in more than one nutrient. Many people agree that the RDA is quite low, especially if you're chronically ill, or you're under a lot of stress. I think it's safe to assume that many of us have nutrient deficiencies. This is playing some part, although we don't know how much, in all the chronic illness. Certainly with the poisons there's a direct cancer connection.

So now we have people who are sick, people who are interested in learning, people who feel intuitively that they want this information, and there's lots of information out there. There are actually many good studies that have been ignored over the years. Some of the studies are 30 and 40 years old. They are excellently done and point the way for us, and more and more studies are coming out. We have a lot to look at, and also a lot that needs to be done. One of my hopes for this conference is that we can start sparking interest in the cancer establishment to really look into these things.

I have to work somewhat intuitively with my patients. I use my common sense and my clinical judgment to get people on whole foods and experiment with what makes them feel good. I give them supplements, but there is not a lot of data about forms of supplements, absorption rates, how much is too much. How do we begin to do individual diagnostic work-ups to see what different people need? We know that one person can require sometimes up to 40 times more of a nutrient than another person. How do we begin to individualize diets that will meet the specific needs of a specific patient? My hope is that today we're going to hear all kinds of good news and good information about what has been done and will identify some areas where we need further research.

I'm very pleased to introduce to you Dr. Harry Preuss, a graduate of Cornell Medical School. He has spent several years specializing in renal physiology and doing clinical and research training in nephrology at Georgetown. He's currently a professor there, both in medicine and pathology. A member of the Council for Alternative Medicine at NIH, he has received numerous grants from NIH to do research projects. A certified nutrition specialist, he has published widely – over 150 peer-reviewed research papers. Dr. Preuss has written chapters in over 90 books, edited four books, and has been interested in nutrition for a long time. From the short conversation we've had, I feel he has a critical and balanced look at where we are and where we need to go. Please welcome Harry Preuss.

Dr. Preuss: Thank you very much, Susan. As a nephrologist, I really started out in nutrition because I was trying to figure out what raised blood pressure and lowered blood pressure. We know from the last talk that the placebo effect works beautifully, so we always have to test everything against a placebo. When I got the call to talk here on cancer, I thought, gee, I really don't do cancer. I do hypertension. The things that I'll show you all pertain to heart disease and hypertension. I can always tell you that if they don't work for cancer, they'll sure make your heart do well. We can start out on that basis. I know from going through the literature on nutrition, that anything I tell you, you could find papers that show just the opposite. That's part of science. You're just stuck with this. There will always be a paper coming down that will disprove whatever you believe in. You write another paper disproving that belief, and you go on and on. I've tried to hone out what I believe.

I was listening to the last lecture and I heard a little Immanuel Kant there and a little John Locke. In one of the lectures somebody was talking about George Washington and alternative

medicine. I thought yes, but if George had penicillin he'd still be alive. George supposedly died of strep throat. I don't even think about alternative medicine. I got on this alternative medical council and found out as a nutritionist I'm on the other end of it. People resent me being a nutritionist. They think that's too mainstream. Let me start out. It doesn't bother me if you ask questions. If I say something you don't understand, you'll sit there thinking about it and you'll miss everything that goes on. If there's something that really you want to know, just raise your hand and we'll go through it.

I'll start out with the usual thing, the fats. We all know there's an awful lot of cancer around. If you look at friends, neighbors, you almost think that breast cancer is having an epidemic right now. You see from these figures that it's a bad scenario. At least up until 1990 it was rising, and we can debate whether it has leveled off or not. The cost is tremendous, of course. Look at the figures. The American Cancer Society says one-third of the cancers that are developed here are due in some way to dietary factors. If you go to the National Academy of Science these figures even go up a little bit. I don't know how they get those statistics that close, but there's an awful lot of cancer that has some association with diet.

What are these associations? I've tried to pick out the mainstream ones. Looking at three of the leading forms of cancer in this country, what are the associations? As you go through all the literature and cull it out, there certainly is a very close association with vegetables and fruits with colorectal cancer. What do they think is the reason for that? We always take a product like a fruit and try to divide it down like the pharmaceutical agencies do to find exactly what it is, but there are usually a lot of things present. Antioxidants and fibers are two of the most prominent things. And that old saw – eat your five fruits and vegetables – really works, but for a lot of people it's like telling them to stop smoking.

I knew as a medical student many years ago that smoking is bad for you. Everybody knew that, but 20-25% of the population still smokes. We can say the same thing, eat your fruits and vegetables. We can tell kids that. At least we're informing them that the more you eat, the better off you are in this respect. That's probably true for breast cancer. There have been various associations. I should put calories in there, obesity, too much alcohol, fruits seem to decrease it, and there's always this big battle over fat. I've heard caffeine with cystic disease of the breast. I'll go into more detail on that.

As far as the prostate goes, recent findings show there is association with fats, particularly animal fats. There is an association with red meat intake, and when some of these statisticians can cull it out, they say there's something in red meat. Maybe it's these so-called heterocyclic amines. A lot of it would be the fats but there's something else there. I always think about this when I'm out back barbecuing a steak or hamburgers and getting a little black on them. What am I doing to myself? I read somewhere that vitamin C is good for that, so I make sure I get my vitamin C. There's been association with tomatoes – that redness and the lycopenes there – and recently we saw an article that said vitamin E is good.

Probably any antioxidant is good. I will spend a lot of time on antioxidants. They knock down blood pressure. They work beautifully on glucose metabolism, which I'm interested in. I'll show an effect on cancer. The more I learn about antioxidants the less I know. The reason I like to talk to you is that I always learn something when I have to talk. We're all in a state of learning. When it comes to antioxidants – how much you should take and what are the combinations – I don't believe anyone really knows the answer.

We've got to do a lot of studies to figure out what we should be doing. We probably should take a battery of different antioxidants. We have found out if you take too much of E

without C you've got a pro-oxidant. Did the beta carotene study come out bad because the beta carotene they gave became a pro-oxidant? It could be deadly on the other side. Too much of antioxidants can become pro-oxidants, and then you've got problems. You have to know what you're doing. We're in the stage of learning about that right now.

Nutrients. I will talk to you about calories, and calories are indirectly associated with obesity and fat accumulation. One of these days I'll give you a lecture on obesity and show you it's the fat accumulation. Don't worry about the weight. You can't follow obesity with just doing body weight. This will be very important. I won't talk about red meats other than what I just told you. There's something maybe in red meats over and above just fat that can be bad for us. But again, in moderation, there are some good things in meat, too.

I will discuss fibers. Fruits and vegetables we may touch upon, but I'll be talking about fibers and then the antioxidants. Too much alcohol is associated with various forms of cancer. You've got to cut down. If you like your wine, drink one or two glasses, but not too much alcohol. Why do we worry about these things? You're going to take all these drugs we've heard about. And the problem with the drugs is that they cause all these problems. You live with the bad effects. You go through chemotherapy, and that's like putting someone through a concentration camp, but then again it has its benefits. At Georgetown I'm the chairman of the IRB, so for 20 years I've been looking at risk benefits of every human protocol that comes there. There are risks and benefits you have to know.

What can we do? We do a lot of animal studies. I like to do animal studies because the animals do what I want them to do. When I give them a diet, I know what they're taking. When you do a human study, you have to have a lot of people because some people bend the rules. But here this guy is eating a lot of calories. I use this because I do a lot of work with sugar and blood

pressure. Someone once told me it wasn't the sugar, it was the fat. It's probably both. With practically every chronic disease we mention you're better off if you can keep your weight down. It's a battle. For some people it's a big battle.

What do we know about caloric restriction? The most we know comes from NIH. They basically compare two different sets of rats, a control, and another set that receives fewer calories. They show that when you food restrict these rats – these are eating regularly, and rats eat all day and all night – when you food restrict, look at the median length of life, the age of the oldest of the old, the maximum length of life. Roughly these animals live 40 to 50% better. I'm told these animals are leaner, meaner and in better shape. I asked a friend of mine at the NIH. Why don't people do this? You go to the meetings of the people who do this research and more than half of them are fat. They can't do it. We use this as a mechanism to study disease. We don't think it has any therapeutic merit, other than yes, let's keep our weight down.

This will go more specifically with looking at tumors. These are tumors of the rats. The less they eat, the smaller the tumor. Simplistically we could say you give the tumor less food and it's not going to grow, but you can see here what's going on with caloric restriction. Here's another case where you take a mammary sort of tumor in the rat and you give various restrictions of the diet. The less you eat, the less of a problem. We know that caloric restriction really keeps those animals alive that 30 or 40% longer. It's the most consistent thing that will do it, so it becomes very important to understand why it's happening. Rodents are very prone to develop cancers, and that's why they're looked at. In every study, it doesn't prevent the formation of the tumors, but over time, they get their tumors a little later in life, and they're smaller. It's effective. Here I've taken the incidence of the tumors and cysts in aging female mice, and you'll

see the incidence. The red is the caloric restriction and the others are the ad libitem fed animals. You can see there's a decided difference in tumor incidence there.

It's regular. The one thing they have done is look at it in different stages of life. When the animal lives half of its life and then starts the thing, you can still get an effect, but you don't get the maximum effect. So you're better starting off. Obviously if we did this to humans in very young people, they would have problems with sexual maturation, a lot of things going on.

Why might this happen? These are just some of my thoughts. Why do we age? Why do we develop tumors? One of the markers of aging is that we become insulin resistant. Many years ago when Banting and Bess discovered insulin, we thought all we have to do is give insulin back to people and we solve their diabetes problem. Then a few years later someone said there's another form of diabetes. These people have all the symptoms of diabetes, but they have high levels of insulin. We started thinking about it and thought the insulin doesn't work properly – it's got to go to receptors to work on the periphery, and then this receptor has to do something else, so this form, which is associated with aging and obesity, is called Type 2 diabetes.

Both humans and rats, as they age, tend to become insulin resistant, so that if you're looking for a marker of aging you could look for insulin resistance. This is a plasma glucose level on animals eating normal glucose levels, and this is those that are calorically restricted. Throughout a daytime period they always have a lower glucose level. By doing this caloric restriction and keeping our glucose insulin system in check, we are also affecting this glycosylation process that can hurt us, as well as free radical formation. This shows you some numbers of animals at different ages and what happens with food restricted animals as compared with normals. Their glucose levels are always less.

One theory of aging is that if we could prevent this insulin resistance – through caloric restriction or other things we can do, like keeping our weight down, exercising, all those things we know are good for us – we will live longer and perhaps have less of a tumor burden. As our insulin receptors and our mechanisms do not work, the body tries to adjust by raising the insulin levels on the periphery, and that's been proven to be harmless. That's associated with a lot of problems. Insulin is one of the primary growth factors in the body. You heard today an insulin-like growth factor, IGF, is closely associated with breast carcinoma. As we get peripheral problems with our insulin, and our body attempts to compensate with more insulin, then we can stimulate tumor growth even more.

I often ask a friend of mine, because I wanted to do work on this, "These caloric restriction studies are wonderful, and you're showing all this. Why don't you try to repeat them with diet?" There are things in the diet that can affect this insulin sensitivity, and they haven't gone to this yet. I heard from Richard Anderson, who's the expert on chromium in the country, that they started a recent study on diabetes. They had various arms on it, but one was Metformin, and another was this substance called troglitazone which is known in the trade as Rezulin. These compounds had been developed to work specifically on insulin sensitivity on the periphery to make it more sensitive.

Lo and behold, they dropped blood pressure, because that was one theory I was working on. This troglitazone was working beautifully. I remember telling Richard Anderson about the first paper I read on it, and he said it works like chromium. But when NIH developed the study they used the drug, they didn't use the chromium. I heard they've withdrawn the troglitazone arm. I assume this was because of hepatic toxicity which has been noted before with this drug. One of these days we may check to see what happens to this.

I don't know if you're familiar with this. We've talked about the fact that there's insulin resistance, which is associated – it doesn't have to quite be Type 2 diabetes, but could lead to it – has increased free radicals, occurs when we're aging. In the literature that's called insulin resistance syndrome, with hyperinsulin anemia. It's associated with all these problems that go under the name Syndrome X. Hypertension is how I got into it. You have dyslipidemias that develop, of course the atherosclerosis associated with some of these problems, the diabetes, and obesity. I haven't figured out in most cases which comes first. Do we become obese and then become insulin resistant, because that's known to occur, or are we insulin resistant and become obese, or does it just keep working in either direction?

This is the so-called Syndrome X. It has some role with the progression and growth of tumors. This will show you that doing glucose tolerance tests, as you age you become insulin resistant. I wanted to show you data. We say, where's the hard data? You can see this data in about five or six different papers. This is one of the theories that I'm working on. As we age we become insulin resistant with hyperglycemia, we increase glycosylation, we increase free radical formation, and you see all these other goodies that have been associated. It affects the DHEA system. It causes physiological aging, and one of the things is tumor growth.

What do we know about fat? I've just showed you calories. Here's another study, very cleverly done, trying to control everything, looking at the production of skin tumors in animals and how you can prevent them. If you have calories that are low, and fat that's low, you can keep the formation of those tumors practically nil. He found it's nil. I'm surprised he got such great results. If you go to the other end, you have lots of calories and high fat, the formation of those skin tumors increases. If you vary either one of these you get something in between zero

and 66%. What you can think about, if you want to study this slide, is that calories look a little more important than fat, at least in this study.

Here's another study on rats showing tumor formation. This person put different levels of fat in the diet, looked at the production of the tumors, and found there was a cut-off point. You could have a little fat in the diet, but at a certain point you can have too much. We have to figure out what this cut off point is for the population, but for every individual it probably varies a little bit. Of course the latest is try to keep your calories from fat under 30%, and especially watch your saturated.

Participant: Can you define the kind of fat you're talking about?

Dr. Preuss: Let me go on with that. Mainly it will be saturated fats, and if you go through the literature you'll find a lot of disparity. Some people even say some of the polyunsaturateds are bad for you. Some will say that some of the omega 6's are good and the omega 3's are bad. You don't have any consistency. I'll show you where there is at least one consistency.

If you look at the percent of total fat here, and you look at different countries, and age-adjusted morbidity rates from tumors, there seems to be an increase. The author says there's a cut-off point at 30% of calories as fat. I see it almost as a slow progression, but the indication from this guy is that if you keep below 30% you can avoid tumors. If they did vegetable fats there was no correlation, but if they did animal fats you see the same correlation.

One of the problems with doing epidemiology studies is that if you go from country to country, there are such wide variations you begin to see nice little correlations. If you go among

a population like the one in this country, the variations in the amount of fat consumed are so narrow that you can't pick these things up, and this is one of the problems. What are we looking at – a difference of 30 to 34% -- how much variation are we looking at? Maybe it's not as widespread as here where you can really pick up the results.

Participant: What about olive oil?

Dr. Preuss: It's supposed to be good, but I don't see the proof there. They just say that, and have few data. I have a friend who would say anything that has a trans fatty acid is bad for you. Here we see again the same correlation with estrogen. Looking at breast cancer, of course, estrogen is supposed to be very important. One potential is that the more fat you eat, the higher the estrogen level. So this could be one of the things that is adding to the problem with too much fat. Looking at it the other way, if you take dietary fiber you just get the other end of it, you get it coming down.

I'm always looking at soluble fiber such as seen in oats. The emphasis is that you're better off with wheat fiber to see changes like this occurring. Usually soluble fibers are the things associated with good effects on the cardiovascular system. If you had cellulose, an insoluble fiber, usually you would think it's better for gastrointestinal tumors. In this case, the fellow doing these studies, controlling them, says wheat worked the best. Oats didn't. Wheat is an insoluble fiber mainly.

These things I'm talking about, if you do them right, have few side effects. If you eat too much fiber you'll know what the side effect is, but it's not going to kill you. We talked about fat, and the general impression is cut down on your fats, especially the animal fats and the

saturated fats. The evidence isn't 100%. If you look at breast cancer, some people say it's there, others say they don't find it. Balance the insoluble and the soluble fibers. Certainly keep your calories down. Don't get obese. If you look at the cancer literature, there's a lot of diversity and you can become confused. These things are good for the cardiovascular system, so it makes good sense to do them for your general health anyway.

What do antioxidants have to do with tumor formation? A couple of months ago I met John Peduto from somewhere in the midwest who works on resveratrol. This is an antioxidant. It's a diphenyl stilbene, a very powerful antioxidant. He was going through plants to see what they would do. He was looking at what is called a cox-1 system. That's an enzyme, cyclooxygenase that converts, makes prostaglandins. It's in the prostaglandin system. It works on arachidonic acid. This system has been associated with tumor formation, so to find out which of his potential plant products could work, he looked at this cox system.

I got some of this product from Mr. Downs. We checked it, and it sure works on the cox system. I don't do it, but I handed it to a buddy and he said it works beautifully. The other one I'm going to talk about, grape seed extract, also works on this system. He had a paper published in *Science* which shows the effects of the resveratrol on tumor genesis in the mouse skin model. If you add different amounts of resveratrol the tumor formation is slowed down. This is getting a lot of press right now. There are no clinical trials obviously, but again it's a very interesting thing. You think, well, what's the harm? The benefits may be there. We hope that they're there. He's going to continue on with this.

I wanted to show you some of our work. We're interested in antioxidants and what they do to blood pressure, so we got some grape seed extract and combined it with a zinc complex and ChromeMate. I love chromium. I could talk about chromium forever. Rats with supposedly

normal tension as they age, look at the height of the blood pressure. If they go on these three antioxidants, the blood pressure never increases for a year of their life. No toxicity, nothing we could see. We didn't go on with these studies, but as these animals got really old I'm sure this group would have shown remarkable results compared with this. We think this may be comparable to doing a caloric restriction. These animals are normal weight. They look happier; they're not mean like the poor hungry animals. I'm now collecting papers. I have about 20 showing that there is a higher incidence of tumors in hypertensive individuals, so there may be some very common things going on between them that we're going to be looking for.

Let me show you a little of our research. This is a look at grape seed extract. This is a powerful antioxidant. For those who know about it, proanthocyanidin, and these are very powerful antioxidants. I'll mention the trade name, ActiVin. There are quite a few grape seed extracts. They're done differently. I mention this one because they're the ones that support the research. ActiVin works very powerfully, and we wanted to see what it would do as an antioxidant. Compared to vitamin E, the ActiVin exceeds it. It's more powerful on a weight basis. If we look at another chemoluminescence response, we're looking at a little different free radical formation here. Again, I'm just pointing out ActiVin is very much more powerful than vitamin C in this respect. The grape seed extract, which may have something to do with the French paradox in cardiovascular disease, is seemingly working here. When the antibiotics came out, we had the first generation, then new antibiotics came out and we had second generations and third generations. It's like we're coming out with second generation antioxidants.

We've talked about the resveratrol, grape seed extract, green tea. Green tea is a very powerful antioxidant like these. Is one better than the other? I can't tell you. Would they work

better together? I can't tell you, but these are very interesting things we ought to be looking at. We know ActiVin is a potent scavenger of the superoxide and hydroxyl radical, free radicals we're talking about. It's more powerful in vitro at least than vitamins C and E.

We did this all in vitro. We generated free radicals. We looked at what happened. What happens in a living animal? We have to go to the next stage. If we take animals and start feeding them their various vitamins about ten days in advance, then three days later we give them a broth in their peritoneum to get macrophages developing, and then a couple of hours before death we give them something to increase the free radical formation called TPA, you'll see free radicals here and how they responded and the inhibition to them. Each of these compared to a control situation is very powerful in inhibiting free radical formation. Grape seed extract is very powerful, even a little more powerful than adding the E and the C together. So there's inhibition of the free radical. If we look at a marker of free radical formation, which is the breakdown of the lipid membrane, very important. If we look at the so-called TBARS assay, if you're in science, we're looking at fat breakdown from free radicals, you again find that they all work very powerfully with the grape seed. If you look at DNA fragmentation, free radicals cause membrane problems, they cause DNA problems, we're looking at one of the DNA problems, grape seed extract is again very powerful in preventing this from developing. The conclusion is that it's a potent scavenger in vitro and even more so than some of these others. It's highly bioavailable to the brain and the liver. We want to look at free radical damage. We did confocal microscopy. These are normal cells. If you put hydrogen peroxide in with these cells to increase the free radical damage to them, you'll see the yellowish is the damage. But, if we incubate them with grape seed extract, you see less and less damage going on, so it's protective.

Free radicals may have something to do with tumor formation. There's this thing which is programmed cell death. I think you heard this mentioned in the other lectures, apoptosis. Apoptosis is different than necrosis. If I take the oxygen away from the cell it will die, it becomes necrotic. Apoptosis is programmed death. Free radicals can cause an increase in apoptosis. Apoptosis describes a series of changes that cells undergo during programmed or physiologic cell death. We can see things happening to the nucleus and just look at it and say this is apoptotic death. Free radicals trigger that apoptotic death.

Participant: Can you explain what you mean by program?

Dr. Preuss: Programmed. Instead of taking a cell and just cutting off its oxygen, and it just dies and disintegrates, with this something happens to this cell that it starts to die through a program. It may be that DNA gives out something – there are various proteins formed with the DNA that increase this programmed death. But it's an orderly form of death. If we look at human oral cells, we see them growing in culture there. We can add tobacco products, and we see in the blue these are apoptotic cells. The more tobacco that you add, the more apoptotic death you have. If you add various things like ActiVin, see the control situation here, how much less death there is. You've protected those cells. If you believe that injury to a cell like tobacco can cause all of these things to go on, and the apoptosis is signaling something is wrong with the cell, then you're decreasing this injurious state. You've got to look at programmed cell death in two ways. This slide shows that you're protecting the cells from whatever that injury is that could lead to cancer.

But once you add the cancer, there's always the possibility that you want apoptosis to take place in those cells. One of the theories of why fiber works so well in your gastrointestinal tract is that it's broken down to form this four chain butyric acid. Butyric acid works on the cell in such a way that it increases apoptosis in cancer cells. There has been a recent paper saying fiber may work in this way. Fiber could work a number of ways. It could dilute carcinogens by bulk. It could affect the bacterial growth. It could bind bile acids, but the other is that it could increase this programmed death in cancer cells. We say that ActiVin significantly inhibits.

Here's the meat of it. I've been leading into this. What can antioxidants do to cancer cells themselves? Here we're taking human cancer cells. These aren't animal cells, animal tumors. We're growing them in culture. Human cancer cells. Would it induce cytotoxicity towards human cancer cells while enhancing the growth and viability of normal cells? That's the hypothesis we started out with, looking at human breast cancer cells. What you're seeing here is the normal growth pattern of these cells, and then the increase with ActiVin, the grape seed extract. You see over a matter of days what's happening. The fact that you're getting holes here and disjunction of the cells is showing you death of the cells.

If you want to look at a dye study, normal cells or cancer cells will break down this precursor and form a dye. This is the formation of the dye in the cancer cells. In the presence of the grape seed extract the cells are dying, there's less and less of the cells there. These are lung cancer cells, with the same sort of thing going on. The amount of grape seed extract over a matter days, more and more death of these cells. Looking at it this way, again, we can look at the dye. There are less and less cells as we add the grape seed extract, a powerful antioxidant. These are human gastric cells. Again, the same sort of thing. In the presence of this antioxidant,

over time they're starting to disappear. Again looking at the dye shows you that that's indeed the case. We not only see it, we can quantify it.

I always ask, what's the next thing you want to know? I could throw cyanide in here and you'd see a wonderful result. We'd say cyanide is a great antitumor drug. It would kill everything, it would be wonderful. So you want to ask, what about normal cells? Here it is. It's the same sort of thing. It doesn't affect normal cells. These are gastric cells. We saw gastric cancer there, where it was killing them. These are normal cells, and in fact there's a claim they grow even a little better. I don't have the data, but my colleagues at Creighton are looking to see whether the grape seed extract would be protective against chemotherapeutic agents. They're finding very preliminarily that it is a little bit protective. What a wonderful thought that would be as we progress with this. You're taking an antioxidant, which if you know what you're doing and in the right amounts, is relatively safe. Perhaps it's killing the tumors and protecting the others. I saw some of the writings by Dr. Simone. There's a question about should you be using antioxidants? Do they affect chemotherapy? I don't think anyone has the answer to that, but he kind of says no. I don't see why it should, myself. I never believe anything until I see it.

In conclusion, this strong antioxidant, just like resveratrol, which is having big trials now, exhibits a toxicity towards human breast cancer, human lung cancer, human gastric cancer. It enhances the growth, if anything, of normal gastric cells. It did not work on a leukemic cell line, so it may not work on everything. It worked on these, but when it was checked on a leukemic cell line it didn't work. Up in Creighton, you can see a whole team of people have to do this work. They're going on to the next phase, which will be looking at the cytoprotectivity of these things. This particular guy says, "Relax, I found out we're in the control group." But maybe in these cancer chemotherapies you want to be in the test group.

Dr. Lord: I had a few questions as we went along. The first one was when you were talking about the underfeeding, the caloric restriction. I'm wondering exactly what that means. Is that like modified starvation, or is this an adequate minimum caloric intake?

Dr. Preuss: This is adequate, obviously in that they lived longer. There's no doubt they lived 40% longer. If you look at the various cardiovascular risk factors, they're in much better shape. The closest that we have is those people who went into the biosphere. They had to live on their own food for two years. When they came out, they had lost quite a bit of weight, they were low on calories, and every one of their risk factors I saw was better, mainly cardiovascular. In the case of these animals, where you can follow them, they live about three and a half years. There is slowing of tumor formation and much less tumor formation, so these things are somehow interrelated. We do have biosphere data, but most people just can't severely limit themselves like that.

Dr. Lord: So you're talking about quite a severe restriction?

Dr. Preuss: I think so, but you want the severity because you want an end result that will show you significance statistically. For all of us over the long run, it's better to keep your weight down as best you can and exercise, and all these things work practically on every system that I look at. They work beautifully on all our systems, and mainly on the glucose insulin system. I would advise everyone to do that to the best of their ability.

Dr. Lord: Does everyone understand about free radicals and the connection with cancer? Is there anyone who doesn't understand that, why it's important?

Dr. Preuss: I think they're using it for general health. I take it, after I saw my rat results. People say, what do you take? I say I believe in nothing. I started to do this study, and I started to work with chromium. I saw that it worked on the insulin system and dropped the blood pressure in my rats, so I started on chromium. My lab partner is working on garlic. I was laughing at him because he was taking garlic, and it dropped the blood pressure of the animals beautifully. It works as an ACE inhibitor, and for those that know medicine, ACE inhibitors are a big thing for blood pressure decrease. They work to prevent the second heart attack, to slow progressive renal failure. We're doing big studies at Georgetown on that now. I looked and said, no wonder garlic works. I was talking to the cashier at the Giant food market, and she said something about garlic. I said it's good for your heart, and she said my cardiologist gives it to me. I thought, well, her cardiologist is giving it to her. So I do that. I take ActiVin because it works on my rats. I take all these things when I see they work. And look at me, how wonderful I am right now.

Dr. Lord: I would like to ask the questions so we can get them on the tape. Why don't we collect all the cards and take a ten-minute break. Then I'll ask the questions.

Dr. Preuss: It's chromium polynicotinate, and the brand is ChromeMate. You all want to use ChromeMate. Why do you want to use it? They support my research. You know you have to support the people who support me. They do the work and I can tell you it works by doing it.

Participant: Just because these things work in a rat doesn't mean they will work in a human.

Dr. Preuss: You don't think the human studies count? There are a number of studies out there that show what I'm telling you. Do you know the China study? Why are you so skeptical? Did you look at the China study that just came out last year? Be skeptical, but read *Diabetes Care*. Do you think *Diabetes Care* is a second-rate journal?

Participant: Then say you take it because of human studies. Don't say you take it because it works in rats. That's all I'm saying.

Dr. Preuss: All right, but you're just talking semantics now, because I look to see whether it works in humans. You're being very skeptical. Look at the study. It's in *Diabetes Care*. It works on the insulin system. It works on Type 2 diabetes insulin resistance. It probably works on the periphery in the receptors, but it may work post-receptor. That's hard to cut out. They went to China and gave Type 2 diabetics 1,000 micrograms a day. That's a big load, but these are Type 2 diabetics. The hemoglobin HbA1Cs in about three to four months dropped to normal range.

Dr. Lord: The first question has to do with different forms of chromium. Is there a particular form that is better at potentiating insulin uptake?

Dr. Preuss: What has usually been shown is that organic forms of chromium are better than the old standard chromium chloride. We started originally with chromium chloride, and that was very effective. The problem with chromium is to get it into a site where it actually works. Our best knowledge now is that chromium doesn't work alone. Chromium must form some sort of a compound in a cell to be effective. They've been looking for a factor called the glucose tolerance factor for years, which is chromium with some amino acids tied up. There probably could be other forms of chromium. The big thing about chromium is that it must get into the cell, it must form an active complex.

There are certain foods that are loaded with chromium, but then they don't have the activity. Brewer's yeast and Carling's Black Label Beer have a lot of chromium in them. My friend actually checked beers and Carling's Black Label had the most chromium. The best thing is to take an organic form, and the leading ones at the moment would be the chromium polynicotinate variety and the chromium picolinate. Chromium picolinate is the one most people take at the moment. It is probably very good, but there are a couple of cases that keep coming out of a supposed toxicity.

I really don't think it's toxic, but the cases are there, and when I read them in the medical literature people blame chromium instantly. I say why not the picolinate, why aren't you looking at it, because we know if you take too much picolinate it can cause hemolytic anemias and things of that sort. For various reasons I take chromium polynicotinate. The manufacturer gives it to me free and they do support my research. In the long run it's safer. I don't want to worry about the other stuff. I had one guy who said it sounds too much like nicotine. It has nothing to do with nicotine. We also call it niacin-bound chromium. That's easier to remember.

Dr. Lord: What I would like to say to all of you who are thinking about putting together a nutrition program for yourself is that there are wonderful nutritionists out there and more and more doctors are beginning to help you evaluate your own health. Before you start isolating particular minerals or vitamins and taking them in higher doses, I would suggest you get evaluated. We do have tests now. We can look at your vitamin levels, we can look at your mineral levels, and I would not supplement unless you have a demonstrated deficiency.

Participant: What's the best way to choose a professional?

Dr. Lord: I would go with recommendations from friends who have gone, or interview them and see what their credentials are. Generally dietitians who are traditionally trained will tell you that they don't think you need any supplements. I don't personally agree with that. You need to see what their philosophy is and general recommendations and see if it feels right.

Dr. Preuss: Let me interject here, because it's philosophical. I don't know the answer to it, but when I talk to most dietitians they always talk about taking something to replace a deficiency. The question I always ask is, are we better off with a little more? I did that with Richard Anderson. I had just started to look at chromium and was getting these results. He kept saying you're replacing a deficiency. I don't know if I'm replacing a deficiency. I'm increasing the levels of it. After his China study that I just quoted to you he said maybe we aren't replacing deficiency. It's working by having more. Vitamin E and things of this sort that are working on our system, are we replacing a deficiency? I don't know.

Dr. Lord: We have to remember that everybody needs different amounts. My guess is that it certainly wouldn't hurt to be at the high end of normal, but you can make mistakes. For instance, I have a patient who I tested and she had selenium levels that are off the map. She had been taking various combinations of selenium. We know selenium is very good for preventing cancer, but she had very, very high levels. You have to be careful with these things. Do the best you can to get the information about your own body and what you need and then use some common sense. There is some danger in just taking one specific nutrient and taking high doses. In my experience most people have chromium deficiencies. It's very common, just as insulin problems. People are having a lot of trouble with their glucose metabolism, and it can range from hypoglycemia to diabetes and everything in between. It's definitely a very common problem. Another question is does the insulin resistance you mentioned have any relationship to hypoglycemia? Is grape seed extract present in wine?

Dr. Preuss. Hypoglycemia is really a separate problem. You certainly can have insulin problems and give people a bowl of sugar and then shortly after you see the effects of too much sugar in the system, and then they have a post-absorptive effect and they go lower. Hypoglycemia could be related in some way to the system, and some diabetics do have this little bit of tendency. The beauty of chromium is that Richard Anderson did take seven people with reactive hypoglycemia – we always think that chromium is good for diabetics – and he showed that, for the most part, it disappeared on chromium. Chromium didn't tend to lower the sugar below normal levels, and at the same time when people had hypoglycemia it straightened it out a little bit. Was there another one?

Dr. Lord: Do you want to talk about what grape seed extract is?

Dr. Preuss: Grape seed, these very powerful sets of antioxidants going by different names – Chalconic acid, bioflavenoids, isoflavones, stilbenes and all – there are about 4,000 of these bioflavenoids out there. They're very powerful in grapes, and they're in the seed. Especially these so-called oligomeric proanthocyanidins, OPCs, are very powerful. The resveratrol I mentioned tends to be in the skin, so anything with a lot of color like that, that bluish color – blueberries, strawberries are loaded with these things. Yes, it is in wine, particularly red wine, because they ferment it in the seed supposedly, and with the skins in there, so you're better off with it. It's in good grape juice as well.

The same sorts of things are in green tea, and my friend Richard Anderson was telling me how wonderful cinnamon was when he was studying diabetes. I would laugh because he'd go to Price Club and buy a big can of McCormick's cinnamon. We tested it in our rats, and it works beautifully. I've spent two years trying to find out what it is, but it appears to be some polyphenolic compound, maybe a Chalconic acid. I always tell people with diabetes, eat your oats, which is good for diabetes, and put a lot of cinnamon on it.

Dr. Lord: Any physiological process in the body will create metabolites, some of them free radicals. Free radicals are dangerous. By themselves they can damage your DNA, they can damage cells. We have a balancing system in the body called antioxidants, and those are the kinds of compounds we've been talking about. They act like a sponge. They go around and mop up the free radicals before they can do damage. If your system is in balance, there shouldn't be a problem. But stress and chemicals and exposures to pesticides, herbicides, diet –

red meat tends to cause more free radicals. If you're eating a lot of junk foods and fatty foods, those things will cause more free radicals. If you're eating those kinds of things you need more antioxidants. The idea is to try to create some balance. If you eat a cleaner diet you'll have less need of that. The free radicals are also dangerous because they can damage your DNA and we think this certainly has some connection with tumorigenesis.

Dr. Preuss: I'd like to add to what I told you originally about the confusion of working with antioxidants. If you give too much of certain antioxidants, they become pro-oxidants. As an example, if you give a lot of vitamin E and don't cover it with vitamin C you end up with a pro-oxidant. You can do this by taking too much of these. These antioxidants seem to work in different areas. Vitamin C may work in a different area, it's in the water of the body, whereas vitamin E is in membranes and tends to work there.

We have a lot to learn about how these things work together and which ones you should use. I have a hunch it's a combination of them in a right amount. We've really got to chip away and find out what that is. If you take an awful lot of these they could be dangerous for you. I take 400 international units of vitamin E because the *New England Journal of Medicine* has that out for both men and women that it's very good. But you have to be very careful. You have to know a little medicine, because I notice when I cut myself I bleed a little more. Vitamin E works on platelets beautifully. I take aspirin as well, because you're supposed to take aspirin too when you're my age and male.

Dr. Lord: We're really talking about creating balance. What is known about the potency of pycnogenol versus other antioxidants? I think you've answered that. They all work

in a little different way, so they work synergistically. It's not like taking more of the same thing. It may turn out to be better to take a small amount of them for better results. Can we buy ActiVin? Is it available?

Dr. Preuss: I think it's available. Bill, do you want to answer that? This is the eastern regional salesman for InterHealth and he sells the ActiVin.

Participant: It's available through GNC, Nature's Bounty, many different sources. It's in the market. You can find it at pharmacies, health stores.

Dr. Lord: It's essentially proanthocyanidin.

Dr. Preuss. That's what pycnogenol is. They're both mainly proanthocyanidins. One's pine bark.

Dr. Lord: You can get them at any health food store.

Participant: What dose do you recommend?

Dr. Preuss: I'm taking just 100 milligrams in the morning and drinking wine at night. If people don't want to drink wine or grape juice, the label says 100 milligrams twice a day.

Dr. Lord: For the caloric restriction recommendations, are you talking about preventive measures, or also caloric restriction for patients already diagnosed with metastatic cancer?

Dr. Preuss: Mainly it's preventive medicine. That would be the most effective. But it certainly wouldn't hurt anybody who is battling a cancer to be moderate in their caloric intake.

Dr. Lord: Moderation is the key here. The better shape you're in the better your body will be able to withstand whatever treatments you're having. If you're carrying extra weight around, it's a good idea to look at that and let go of some of that. Taking antioxidants while on chemotherapy sounds like not a bad idea.

Dr. Preuss: It's a possibility, but I don't know. I'm giving you the evidence to think about it. In a paper Dr. Simone wrote for here, he talked about some cases where they had done it. Certainly one of the first things an oncologist will tell you as they're lining you up for chemotherapy is, don't take megadoses of these things. That's the way they say, I don't know whether it's good or bad. I wouldn't tell you to take megadoses anyway, even if you didn't have the problem. I don't know how it interferes. Again, moderation during the chemotherapy stages. Afterwards, I would go on something like this in moderation again.

Dr. Lord: There's a question here about a macrobiotic diet. We're going to have Larry Kushi speak about macrobiotic diets and cancer on Sunday. Whoever asked that question might like to come to that. Macrobiotics are very interesting. There is some very interesting data. You have to do it with someone who knows what they're doing. It's very easy to make mistakes

on that diet and become deficient in things. You need someone who is trained, and it's a very big lifestyle change. You have to make a commitment to do it right and get the help you need. I would suggest you come on Sunday and you'll hear more about that.

There's also a question about intravenous vitamin C. I know that there are people using that therapy. I don't know that there have been any studies about it. Anecdotally, many people find it helpful, but as I say, that's anecdotally.

Is there a good guide to how to eat to maximize absorption? I'll take a crack at that. Absorption, the way your gut works is essential. You can take all the pills you want, and if you're not able to digest them and absorb them they're not going to do you any good at all. This is a reason to go to a nutritionist or go to a nutritional MD and have your gut evaluated. We're finding a lot of people have trouble digesting their food, even some people who don't seem to have a lot of symptoms. It's of great concern that you get your gut working well.

What would be a good place to start, as far as what to eat? I do believe we need to individualize diets for everybody, but there are a few guidelines. First of all, if I had cancer I would only eat organic food. If I didn't have cancer, I would still try to eat as organically as possible. I think it's great for prevention and treatment. Try to eat whole foods. Don't eat foods that don't look like food. If you can't identify where it came from then don't eat it.

A lot of people have sugar problems. I recommend that people cut out as much refined sugar from their diet as possible. We know that your immune system is suppressed for five hours after eating sugar. If you have cancer, you don't need that. Also, with this insulin resistance, it's very hard to lose weight if you're having trouble with your carbohydrates. I would eliminate the simple sugars as much as possible, and some people have trouble even with complex carbohydrates. They can't eat a lot of bread and a lot of pasta and things like that.

Those are also processed foods. So the more whole grains, whole vegetables you eat in general, the better.

As far as the ratio of protein to carbohydrates, that's very controversial. There are books that argue well on both sides. I think it's very individual. Some people on a purely vegetarian diet do beautifully. They have lots of energy and they feel great. If they eat meat protein they don't feel well. Other people feel weak without any meat protein. If you're going to eat meat protein, I would eat very little red meat. Stick with mostly fish and maybe a little chicken that has had the fat cut off. Eat organic meat.

Increase your vegetables as much as possible. I generally have people start with half raw and half cooked and see how you do on it. Keep a diary. Become very aware of how your food affects you. You are the experiment and you can figure this out, what makes you feel good. Keep a diary. If you're starting to fall asleep half an hour after you eat, or two hours after you eat, it's something you ate, so experiment with the ratio. With respect to fats, pretty much across the board people are suggesting that we need to cut our fats way back. Americans eat anywhere from 30 to 40% of their calories in fat, and that clearly seems too much. There's a lot of research that's been done and needs to be done on fats. There are good fats and bad fats, fats that help you – all your cell membranes are made out of fat, they're absolutely essential to life. All your steroids, your steroid hormones are all made from cholesterol. You need these fats, but you need good fats, not so much of the saturated red meats. Olive oil is a good choice. I usually put most of my patients on some flax seed oil, because it's very hard to get essential fatty acids in our diet, in a fast food diet. Nuts and seeds are another good way to get that.

Participant: Since the natural resources of the environment provide nutrients for us to thrive in that environment, would it be a good rule of thumb to try and consume those foods that will prosper in the environment in which you live, rather than imported food?

Dr. Lord: Intuitively that's certainly very appealing. In macrobiotics that's one of the tenets, that you eat only foods that are in season and that grow in your area of the country. We need to reevaluate some of the dietary guidelines that these ancient traditions have handed down to us, because with all the intermarrying our genetic makeup is not the same. Diets that were appropriate for people in India, even Indians in this country, may no longer be appropriate, say for Ayurvedic medicine. Sometimes it works wonderfully, but not always. I've had patients come to me who have been put on high dairy diets because that's the Ayurvedic recommendation, yet I find they have lactose intolerance or food allergies to dairy products and they can't tolerate them. Times have changed. Our bodies have changed, stress has changed, our lifestyles are different, much more stressful, the kinds of foods we eat are so different. We need to reevaluate some of that. The basic principles of eating whole foods that are not poisoned will go a long way to making you healthier.

Participant: Could you also comment on farm-raised fish and hydroponics?

Dr. Lord: One versus the other?

Participant. Two questions. One is farm-raised fish, because you have to be very careful when you recommend fish to people. Most fish we get in grocery stores has been farm-raised,

and if you actually look at what those fish are being fed, then it changes the actual nature of eating fish. They're altered by the food that the fish is given.

Dr. Lord: That's certainly true.

Participant. And the second thing is to recommend vegetables is fine, but many vegetables that are presented to us in a grocery store are grown hydroponically. They don't have the same nutritional value.

Dr. Lord: That's very true. This is why we all need to get politically active, because of what's happening. They're threatening to irradiate all of our food. It's very hard to get good quality food. You have to really search it out. Do the best you can.

Food is just working on the material level, and that's only one level of who we are as human beings. It's better to be relaxed and happy and eat junk food than to be incredibly uptight and not ever enjoy your food and to be paranoid about everything you put in your mouth. That kind of stress is much more dangerous. So do the best you can and don't worry about it. Do as much research as you can. Eat as well as you can. Have a treat once in a while and don't worry about it. That's my prescription. You need to get as much information as you can. In many cases you can make slight changes in your diet and it can have tremendous health benefits to you.

Participant: To go on with that, thinking of the session we had before about belief and the mind, the healing process is not just – I know people who just do everything with their diet, but they have no meditation, no mind – it's a whole, and that has to be incorporated too.

Dr. Lord: Right. The comment was how helpful relaxation and meditation are when you're looking at healing. I think you can't underestimate the power of all of that. Food is, like anything, a window of opportunity. When you sit with somebody and look at your diet you're going to learn all kinds of things about yourself. What you're craving, why you're eating. All kinds of emotional issues come up. It's a great opportunity to start taking care of yourself, using food as a way to nourish yourself. Look at the things that cause stress in your life, and take care of those too. This is a whole package – healing, using body-mind techniques. Nutrition is just one level, one way to support your healing. It's very important that you become aware and address all the different aspects of your being, and nourish all of them. That's when healing certainly is more likely to come.

Enzymes and normal digestion, absolutely essential. Many people's guts are not working well, and supplementing with enzymes can definitely help. Again, getting a professional to help you with this is a good idea.

Participant: Would the results on rats vary if you gave them all whole foods, like rat chow or something like that, that places a heavier burden on digestive system, pancreas, etc.?

Dr. Preuss: That's an interesting observation. In the caloric restricted studies they use what they call rat chow. To give the animals 60% of their normal calories back they take the

same chow and they add the minerals and vitamins in a way that the animal is getting the constant minerals and vitamins, it's just the caloric equivalent. I always kid people that I have to pay extra for my diets, because I like to make them like the average American diet. I have simple sugars in there, and complex carbohydrates and fats, and this costs me more. When I do my studies I really can bring the blood pressure up beautifully by giving them an American diet. If we ate like the rats, their normal chow, we'd probably be better off.

Dr. Kushi: I'm also an epidemiologist. You didn't emphasize any epidemiologic studies except for the cross-national studies, which are actually the weakest of study designs in epidemiology. In fact, in the studies that have been done out there, largely based on prevention of cancer, or cancer etiology, there's extreme consistency on various aspects. Fruits and vegetables help prevent a wide variety of cancers. They've been demonstrated in studies conducted all around the world, with different study designs, and that sort of thing. Another thing is red meat intake. You mentioned prostate cancer as a possibility. There's even stronger evidence for colon cancer, in terms of consistency. Those are the first two hallmarks of the American Cancer Society dietary guidelines for prevention of cancer. There's a lot of evidence there.

I also wanted to throw out a cautionary note about supplements, partly influenced by my macrobiotic upbringing. There's very little evidence in human studies that supplements, per se, help in cancer prevention or treatment. A lot of the studies that have been done that corroborate the effects of some of the animal studies and in vitro studies in cardiovascular disease or cancer, basically are corroborating the human studies by antioxidant intake. That's estimated from foods, not from taking supplements. Beta carotene was thought to possibly help prevent lung

cancer, particularly in heavy smokers, because of various reasons. Smoking causes oxidative damage. Beta carotene is an antioxidant. When beta carotene was isolated, and NCI conducted a couple of major trials, it was discovered that in two of the three major trials that were done, the people who were on beta carotene had increased lung cancer rates.

Dr. Preuss: Smokers.

Dr. Kushi: Right. Heavy smokers. They chose the smokers, and there was a good reason to do that, from a hypothesis perspective. There needs to be some caution. I agree that there's pretty good evidence that vitamin E supplements in the cardiovascular disease context really do help, although I published a study in the *New England Journal of Medicine* that showed that it wasn't effective.

Dr. Lord: A study can do that.

Dr. Kushi: Right. There are some other areas in which supplements probably are useful. Folic acid helping to prevent neural tube defects, possibly playing a role in cardiovascular disease, maybe even colon cancer to some extent. Selenium, possibly in some cancers, and that sort of thing. But I would caution taking supplements based solely on studies that you presented. If they're also supported by human studies of one sort of another, then there's a bit more basis for trying to experiment on oneself.

Dr. Lord: Thank you, Larry. That's really helpful. The hard position that you're in is that you're going to have to make some of these decisions for yourself as best you can with the knowledge that you have. The final words aren't out. As far as supplements go, there's a lot we don't know. My feeling is that there's a role for them, and I wish I knew more. I wish we all knew more. If I had cancer I probably would take moderate doses of antioxidants. The quality of our food is such that that's not an unreasonable thing to do, but you really are going to have to make the decision for yourself and try to understand the risks and benefits as best you can. There's not anyone who can really tell you 100% that this is a good idea, or what might happen. You need to use some common sense and get as much information as you can.