Vitamin D, Sun Exposure, and Skin Cancer:

A Special Interview with Dr. John Cannell

By Dr. Joseph Mercola

DM: Dr. Joseph Mercola

JC: Dr. John Cannell

DM: The surgeon general recently came out with a warSning on skin cancer, claiming that the sun is dangerous and you need to stay away from it. Hi, this is Dr. Mercola, helping you take control of your health. Today we are joined by Dr. John Cannell, who has really dedicated the last part of his professional career to the study of vitamin D and its benefits on health. He's also the founder and executive director of the Vitamin D Council. Welcome and thank you for joining us today, Dr. Cannell.

JC: Thank you for having me, Dr. Mercola.

DM: I didn't realize until I'm preparing for this interview. It's no surprise though what specialty the surgeon general has. When you graduate from medical school, you get your degree. But most everyone specializes. Do you know what his specialty is?

JC: I do not.

DM: He's a dermatologist.

JC: Oh.

DM: Big surprise.

JC: They have a different education from what many of us do.

DM: Yes. They obviously, of many of the specialties, are the most biased against vitamin D.

JC: Well, that's because they see the ill effects of the sun. I mean, the sun is a two-edged sword. They only see the ill effects. They don't see the benefits. They see the invasive squamous cell cancers. They see the melanomas. They see the basal cell carcinomas. They have their viewpoint from their own perspective.

DM: Well, why don't we address that because I think that would probably be the most important way to address the apparent confusion on this recommendation and really, the prejudice and the bias that almost every dermatologist has against the sun. Clearly, UV radiation can be dangerous. No one is going to argue against that. The downside, as you mentioned, it can increase the risk for these cancers – squamous cell, basal cell, and melanoma. But why don't you discuss the differences between those and the relationship between the squamous and the basal cell and the melanoma, because there's a significant difference.

JC: Yes, there is. Squamous cell carcinoma is clearly associated with chronic sun exposure. It is more common on the face, the hands, and the scalp. It is related to radiation burden over your lifetime and together with basal cell carcinoma, which is sort of intermediate, it accounts for approximately 1,500 deaths a year in the United States, from the best of my knowledge. Basal cell…

DM: It's 1,500 deaths.

JC: Yes.

DM: That's an important number to remember. We'll go back to it later.

JC: Yes. Basal cell is sort of intermediate. There are studies showing that it is associated with chronic sun exposure, and there are studies showing that it's not associated with chronic sun exposure. And then there's melanoma, which is responsible for almost 9,000 deaths a year and is the deadly skin cancer that is feared. The relationship that melanoma has with the sun is quite complicated. It is clearly associated with sunburn, especially sunburns when you're young (that's incontrovertible) or sunburns in a sun tanning parlor or bed.

However, there are at least two studies that show that melanoma is more common in indoor workers than outdoor workers. The most likely places for melanoma to appear are not the face and the hands like squamous cell carcinoma, but rather the lower back and the upper leg, usually areas that are not chronically sun-exposed.

There's a vocal minority in the dermatological community that thinks that this emphasis that the dermatologists have on avoiding sun exposure is a dead-end road and that sunburns are a risk factor but chronic skin exposure is not. There are a number of studies that show chronic sun exposure is related to melanoma, but they don't separate out the sunburns, which is very hard to do because you have to do that by memory.

There was recently a study we should talk about. I think it was in the *Journal of Internal Medicine* by a Swedish researcher, Dr. Pelle Lindqvist. It was the first study of that kind to my knowledge. It was published only a couple of months ago. It was in May or June of 2014. He studied almost 30,000 Swedish women for 15 years. They were middle-aged to older women. At the beginning of their study, they asked a number of questions about sun exposure: do you sunbathe? Do you take vacations in sunny areas in the winter? Do you garden with short sleeves and shorts? A number. And do you use sun tanning parlors or sunbeds?

Dr. Lindqvist and his colleagues followed these women for up to 20 years. The average follow-up was 15 years. He was able to lump these women into either sun avoiders or sun lovers. What he found (and this was the first time, and to my knowledge, the only time it's been found) is that the women who avoided the sun were twice as likely to die over those 15 years. Now, he explained that by a vitamin D mechanism. But the sun does more than just make vitamin D in the skin. What his study actually showed is that chronic sun exposure appears to be associated with less mortality.

DM: Yeah. Which is the bottomline. The surgeon general, as I said earlier, is a dermatologist. The danger of almost any specialist is they don't take the broader perspective. My specialty is family practice. We're focused. Our entire training is focused on the whole picture and integrating everything into one view for the betterment of the patient. What the surgeon general and almost every other dermatologist fail to examine carefully is the overall mortality, which is referenced in this recent study.

But we know other information. It's really clear. In addition to this study that's been done, dozens if not hundreds of studies document it. I'm wondering if you can review some of the highlights of those that show that in fact when you raise your vitamin D level, ideally through sun exposure, your risk of cancer goes down – overall cancer, not just the skin cancer. It all goes down, mortality from cancers. Some of the Garlands' studies I remember are being as close to 50 percent. We're talking potentially hundreds of thousands of people not dying from other cancers as opposed to 1,500 people who are dying from squamous cell carcinoma.

JC: Yes. Squamous cell, basal cell carcinoma, and melanoma from sunburns. Yes. Dr. Mercola, as you know, from being a family practitioner, everything you do in medicine is a risk-benefit analysis.

DM: That's right.

JC: You know, take two aspirins and call me in the morning is a risk-benefit analysis. You talk to the patient on the phone for a few minutes. You ascertain there's nothing serious and you give them that advice. When you do a risk-benefit analysis and you look at all the data we have, the risk in my opinion appears to be in those who avoid the sun. Now, if you avoid the sun, your risk for non-melanoma skin cancer goes down. That's clear.

But if you look at studies of either latitude or studies of 25-hydroxyvitamin D levels in relation to cancer, you find this inverse relationship: the higher the vitamin D level, the lower the cancer rate. As you pointed out, the Garland brothers were the first ones to discover this and that was back in 1980. That's when they first hypothesized that vitamin D was involved in both the incidents and perhaps even the spread of cancer.

DM: Yeah. Do you remember what their estimation was? I thought it was hundreds of thousands. My memory may not be serving me correctly though.

JC: The person who has done estimates is Dr. William Grant of Sunlight, Nutrition, and Health Research Center (SUNARC). He estimates that if everyone in the United States had a vitamin D level of I think 40 nanograms per milliliter, it would save approximately 150,000 lives a year.

DM: Okay. That's pretty interesting because it's precisely a hundred to one times the rate of the squamous cell cancers, which really are the only ones that are definitively linked to UV exposure. The melanoma one is questionable at best, except for the sunburn exposure. When you can factor in the lack of vitamin D from sun exposure, there may be more benefit than harm from that melanoma, especially with the big clue that it's typically not in locations that are exposed to the sun. I mean, what other giant clue could you ask for?

[----- 10:00 -----]

JC: Right. The Lindqvist studies that I referenced earlier had five questions about UV exposure. One of the questions was: do you use commercially available sunbeds? For the first time in the history of medicine, to my knowledge, Lindqvist showed that the women who use sunbeds had a reduced mortality.

DM: That's a massive piece of evidence.

JC: Now, each of the five interview questions had independent effects. When you combine them all together, the mortality rate was double in the women who avoided the sun. But this study showed that there was an inverse relationship between mortality and the use of sunbeds. Women who used sunbeds tended to live longer than the women who didn't.

DM: This is in direct conflict to what almost every dermatologist will say, including the Surgeon General of the United States, who is a dermatologist, to stay away from tanning beds. We think there are safer tanning beds, of course, and there are different levels of safety. But just in general, because the Lindqvist study clearly didn't differentiate between those two, they found that it didn't matter. They had an overall reduced mortality.

JC: Yes. Low-pressure, old-fashioned sunbeds are fairly close to the spectrum of sunlight at the equator at about 5,000 feet. If you keep that in mind and you use them conservatively, being very careful not to burn, it's not too different from sun exposure. Now, it's important to note this Lindqvist study, to my

knowledge, was the first one that found that the chronic use of sunbeds was associated with reduced mortality. But there have been other studies that have shown no mortality difference. It's important to note that Lindqvist was the first one to report this, to my knowledge.

DM: Yeah. Well, that's an important observation, because it's in direct conflict to the surgeon general's recent recommendation.

JC: Again, it's important to remember that dermatologists see the consequences of sunburns and chronic sun exposure in their office all day long, so that's what their perspective is. I can hardly blame them. I think if I was a dermatologist, I would feel the same way. There are a few dermatologists who do not.

In fact, there was a wonderful paper about six or seven years ago by some British dermatologist called "Melanoma Epidemic: A Midsummer Night's Dream." They pointed out that there was in fact a melanoma epidemic. The diagnosis of melanoma has approximately tripled over the last 30 years, but that increase was virtually all in stage 1 disease, which is when melanoma is confined to the skin. There was no increase in stage 3 disease, which is this distant metastasis.

If you think about an epidemic that is confined only to stage 1 disease, you would realize that such an epidemic is impossible, because there are plenty of people who don't go to the doctor. If there was a true epidemic of melanoma, you would see increasing rates of melanoma in stage 1, stage 2, and stage 3 because plenty of people are going to not come to the doctor's office until they feel the swelling in their armpit, they get a cough, or something with distant metastasis.

It would sort of be like an epidemic of pneumonia, which was only diagnosed by chest X-ray. No patient had increased cough. No patient had increase fever. No patient had chest pain. No patient got sick, but the radiologists were diagnosing pneumonia more often on chest X-rays.

What is happening we think – and what a number of dermatology specialists think is happening – is that there's been a change in how pathologists read moles that are removed from the body. That 30 years ago, they were more likely to call a mole benign, and now, they are more likely to call the mole in stage 2 carcinoma. According to at least two groups that have published about it, they think that this increase in the rates of melanoma is secondary to increased diagnosis on pathology of something that used to be called benign that is now called cancer.

DM: You know, what's particularly sad about the surgeon general's warning is that in the past, we've had previous surgeon generals who were really stalwarts of public health and were true defenders of the public health. The one that comes to my mind – and I'm sure yours and almost everyone's – is C. Everett Koop, who in the early '80s and maybe late '70s, developed a strong campaign against smoking. I don't think anyone would dispute the benefit of that. But this misdirected campaign against the sun is beyond ludicrous, especially coming from a dermatologist.

The dermatology profession is responsible for the mass recommendation of sunscreens that when they were first implemented, and most today, never screened out UVA. They only screened out UVB, which protects against cancer in general and limits the body's ability to produce vitamin D. Yet they were directly responsible for letting the vitamin A come in and giving people a false sense of security, going out on the sun and actually increasing their cancer risk. And they never, never accepted responsibility for that.

JC: Yes. If you look at the use of sunscreen in the last 30 years and you look at the rates of stage 1 melanoma, if the dermatologists were right, the increasing use of sunscreens would have resulted in a decreased incidence of melanoma. But instead you see the exact opposite. As sunscreen use increased, stage 1 melanoma diagnosis increased. It's exactly the opposite of what you expect if their claims about sunscreen and melanoma were true. What is thought is by blocking out UVB, patients were able to stay

out in the sun even longer than they would have otherwise and expose themselves to the more dangerous or at least potentially dangerous UVA radiation that's in the sunshine.

DM: From your knowledge, they have never acknowledged this, have they? They just let it slide under the rug and, "Oh, by the way, yeah, we recognized that and we're now screening for UVA, too, in many of the new sunscreens."

JC: Well, it was discussed fairly heavily in the literature and it was in some lay publications several years ago. It's not clear exactly how, to me at least, they're blocking UVA internally. But there are sunscreens that are marketed that protect against UVA and UVB. What we recommend is what's called safe, sensible sun exposures. The Australian Sun Advisory Board recommends the same thing. I think in England there's now a change in their recommendation from strict sun avoidance to some safe, sensible sun exposure. There are some movements in large organizations to realize that safe, sensible sun exposure is a healthy thing.

The thing that's important to recognize is how quickly sunlight makes vitamin D in the skin. When you sunbathe for half an hour at solar noon in the summer time at most latitudes in the United States, you make between 5,000 to 10,000 international units (IUs) of vitamin D within 30 minutes. You can ask yourself why nature would evolve a mechanism that made so much vitamin D so quickly. When I thought about that question, the only answer I can come up with is nature did it for a good reason. The organism needs vitamin D, so the system in the skin evolved to make it very quickly upon exposure to sunlight.

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We recommend full-body sun exposure for up to anywhere from a few minutes to 30 minutes every day. On those days when you cannot get a full-body sun exposure, we recommend a vitamin D supplement or safe, sensible exposure in a low-pressure UVB bed.

DM: But wouldn't it make sense, if we're replicating ancestral health patterns, that sun exposure every day was not possible in most climates because it rains. I mean, if we didn't have rain, we have serious problems. There are some areas where most of the days are sunny, but those are the exception. It would seem that because vitamin D is fat-soluble, we do have this protective component that we can store this on the days that we're not. If we're getting regular sun exposure, I think the need for an oral supplement is really minimal if not at all, because I personally have not taken oral vitamin D for four years. I just had my level tested last week and it was 70.

JC: Yes. You have a level of what lifeguards have in the summer. Lifeguards, roofers who work on the roof with their shirt off, and gardeners who work outside with their shirt off, in the summer time, they have levels between 40 and 80. It brings up an interesting question about the difference between normal and natural. Normal vitamin D levels are sort of an average of what indoor workers have in both winter and summer. Natural are levels of a population with widespread sun exposure.

There is a researcher, I think in Sweden, named Maxine Luxwolda who went to Tanzania a couple of years ago and measured vitamin D levels in free-living hunter-gatherers around the equator. He found that the average vitamin D level in a free-living hunter-gatherer, even though they had very dark skin, was 46 nanograms per milliliter. The highest recorded one was in a pregnant woman there who has 105 nanograms per milliliter. If one uses the sunshine to get vitamin D, in my opinion, that is the most conservative recommendation you can make because you are replicating the natural mechanism.

And because sunlight affects nitric acid levels in the skin and it affects endorphins in the skin, the group at the University of Wisconsin had recently discovered that there may be a system at 311 nanometers that is separate from the vitamin D system, which is at 298 nanometers, and that there may be an entirely new

undiscovered biochemical system in the skin that makes another substance. That's very exciting. But the way you approach it by sunbathing is the natural way of approaching it.

DM: Yeah. It's pretty simple when you think about it. I've been studying health for about 30 years and trying to understand systems that produce health and prevent disease. The more you study it, the more clear it becomes. It's really pretty simple and one of the basic principles is to replicate ancestral patterns. Being in the sun on a regular basis is a good ancestral pattern. But of course, you never want to get sunburned. No one would dispute that.

Now, I have a question for you. A few years ago, we did an interview and you had a rather startling observation or hypothesis, I guess, might be a better term for it. When you're exposed to the sun, you had a recommendation of not using soap for up to 48 hours, so that you could absorb the vitamin D. Another vitamin D expert, Dr. Michael Holick, disagrees with that pretty strongly, creating somewhat of a controversy. I'm wondering if you've updated your views on that at all or if you still hold the same position.

JC: No. I agree with Dr. Holick. The only study that's been done about that was done in the '30s, and it did show that you can remove oils from your skin that contain vitamin D after sunbed exposure. They took some young athletes, they put them in sunbeds, and then they washed them with both soap and just plain water. They were able to show that what they removed from the skin contained vitamin D. The point that needs to be made is that vitamin D production is made fairly deep in the skin, not on the surface, to what we know, although I think some of the sebum also contains vitamin D and how much of it is absorbed through the skin simply has not been investigated. But I have come around to the opinion of Dr. Holick.

DM: That's good to know that you've changed your position. But I still believe it's probably wise, again replicating ancestral practices, to not use soap a lot. Use it only if necessary and typically in places where it's required such as your armpits and your groin because of the sebum issue. I think you're right. Your body creates these important fatty acids that serve as a barrier and defense, and to wash them away, thinking that you know better, especially when you're adding antibacterial toxins like triclosan, is just foolishness.

JC: When you think about it, Dr. Mercola, what you're saying is that nature probably designed the best body lotion that exists, in the form of sebum. But what Americans do is they take soap, they wash the oily coating off of their skin, then they take a bottle of Max Factor, and they rub [inaudible 26:47] lotion on their skin. That makes no sense.

Water is a good solvent. For years, I've done exactly what you've said. I've washed my armpits and my groin with soap. But I do not wash the other parts of my body with soap. I use water instead. And nobody has accused me of having body odor. Now, whether that's true of young people who are putting out a lot of pheromones, I don't know. It's never been studied. But certainly we have this proclivity to use soap, in my opinion, too often.

DM: Yes. I think you are right, but probably for the wrong reasons. It wasn't right for reducing vitamin D absorption, but you're right for just probably almost as equally important for protecting your body and introducing toxins through most of these soaps. Most of these soaps are not healthy. There's just no question. If you do use soap, use a healthy organic one that's designed not to have toxic substances as you're putting that right into your body, and then you're taking away the good stuff all the fatty acids and the sebum that your body is putting there for a purpose.

JC: Yes, that's right. There's a lot of emphasis these days on the microbiome. Most of the emphasis on the microbiome is on the bacteria, the viruses, and the fungi that live in your colon. But there's a microbiome on your skin. There are millions of bacteria and other organisms that...

DM: No. I have to correct you there. I just did an article on this yesterday. It's not millions – it's ten trillion.

JC: Ten trillion, yes.

DM: Ten percent of the microbiome is on the skin. Ten percent.

JC: Yes. That's right. That's amazing. When you use soap, you're washing off much of that microbiome. What the results of that are, to my knowledge, have never been studied. There's never been a study that looked at skin conditions, for example, in people who use soap on a regular basis, frequent soap users versus people who do not. It would be interesting to see what those studies show. But certainly, the microbiome is interrupted by the use of soap.

DM: Yeah. Now, there may be a clinical situation that may warrant washing. Interestingly, they found that mosquitoes are attracted to certain individuals, and it may be related to the bacteria that are growing. If you happen to get a lot of different mosquito bites, it might be worth the experiment to wash off the bacteria and try changing your diet, so you can grow a different microbiome and so you don't attract the mosquitoes as much.

JC: Yes. I live in California and we don't have any mosquitoes where I live.

DM: A lot of places don't have that. I suspect you're still in a drought out there.

JC: We are. We are in a severe drought.

DM: The mosquitoes need a lot of water to proliferate, and you don't have it there.

JC: Exactly.

DM: Let's get back to the tanning bed issue. We briefly addressed that… You talked about the sun lamps. I would assume that's the older version. I'm wondering if you can maybe just give a brief summary of your impression on the different types of tanning bed that are out there.

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JC: There are basically two types of tanning beds:

1) There are high-pressure UVA beds, which when you go into a sun tanning parlor, the more expensive beds to buy. They tan you the quickest because it's UVA that tans the skin. They contain some UVB spectrum but not very much.

2) And then there are the old-fashioned low-pressure beds, which contain less UVB than sunlight at most latitude, but they contain a significant amount of UVB. Those are the beds that we recommend, again, with safe, sensible approaches that avoid sunburns. Because sunbeds are at such high-intensity, sometimes it's easy to get burned in the bed after only a few minutes of use.

DM: Okay. Thank you for summarizing that. I think we addressed the surgeon general's dermatologist recommendation pretty well. I think if you're a rational human being, I just can't imagine you coming up with any other conclusion. I think it's a seriously flawed recommendation. It's certainly not on par with

C. Everett Koop's one to stop smoking. You have to be discriminative about what you're listening to from government officials.

You've pretty much directed the last part of your clinical professional life to the study of vitamin D, its benefits, and how it could be widely used and improved. I'm wondering if you have any more recent updates, you know, what you've learned since the last time we spoke and interviewed, because there's always more research coming out to enlighten us about the importance of this incredible nutrient.

JC: I've become a little more conservative about the benefits of vitamin D. You have to remember that the vast majority of studies that show vitamin D is related to a health condition are measurements of 25-hydroxy blood levels of vitamin D. Well, blood levels of vitamin D are measurements of vitamin D levels, the circulating vitamin D levels in humans. That's true. But there are also markers of sun exposure.

DM: That's interesting.

JC: If the sun has independent beneficial effects, that is a beneficial effect that's independent of vitamin D, taking an oral supplement will not replicate or will not confirm the hundreds of studies that are out there associating virtually every disease known to man with low vitamin D levels.

DM: Now, let me stop you there for a moment because I think that's an important point. My assumption is when you make that statement is that most of these studies, the majority of the studies… People listening to this, you have to understand that studies take a long time to run. Years at a minimum; decades is more likely for many of these. Would you state that most of these studies were observational studies on people with sun exposure who were actually not taking oral supplements?

JC: Well, the sun exposure is unknown except in very few cases. What is known is their 25-hydroxyvitamin D level, which is a marker for sun exposure. And people with higher sun exposure tend to have higher 25-hydroxyvitamin D levels. However, if one was to say that all of the benefits of sunlight were independent of vitamin D, you would be left with having to explain thousands of test tubes and animal studies that show a clear mechanism of action of vitamin D in so many different diseases. I think in the end, it'll be a combination. I predict other systems will be discovered in the skin that are independent of vitamin D. But so far, other than the Lucas lab in Wisconsin, about such systems…

DM: Yeah. The more you study health, the more you realize that we know a lot less than we know.

JC: That's right. All knowledge, yeah. All knowledge can be categorized in one of three ways: there's what you know you know; there's what you know you don't know; and then there's what you don't know, which by definition, is the largest category.

DM: Yeah. It's so true. I mean, it's not just true for that, it's true for everything. Obviously, our focus and our passion is in health. That's what we put our energies into. We didn't even know about the benefit. In the 20th century, we thought vitamin D was for the prevention of rickets and osteoporosis. We didn't have any idea of its benefit. Obviously, some people did, like Garland. But it wasn't widely known or appreciated, the more important benefits and roles of vitamin D.

JC: Right. Until the turn of the century, vitamin D was thought to only involve the calcium economy. For me, the landmark paper was a 1999 paper by Reinhold Vieth at the University of Toronto, called "Vitamin D Supplementation, 25-hydroxyvitamin D Concentrations, and Safety," in which he reviewed hundreds of studies about vitamin D and concluded that there had been a major mistake made in the recommended amounts of vitamin D. It was that paper that got me involved in starting the Vitamin D Council 12 years ago.

Because when you look at the amount of vitamin D that's made from sun exposure and how rapidly it's made, as I said, it's between the inputs of 5,000 and 10,000 international units at half an hour or an hour. When you look at the inputs that are recommended by the federal government, there's this huge disparity between these. There's an order of magnitude disparity. Now, that doesn't prove that higher doses are in any way useful, but it at least opens up the possibility that there's been a major mistake made and that the recommended amount should be thousands of units a day, not hundreds of units a day.

DM: Yes. What's your impression of I guess the standard of care (might be the best term to use)? It hasn't changed at all since this century. I mean, with respect to recommended daily allowances (RDAs), it hasn't changed much. But from your impression, are most physicians recognizing this and actually recommending this? We know they're testing for it. We've seen an explosion of vitamin D testing. I guess it's probably more widely adopted.

JC: Yes. If you look at all the measurements of interest in vitamin D in the last 10 years, you see there's just exponential explosion in the numbers of studies about vitamin D in the medical literature, in the number of people taking vitamin D supplements, and in the number of people having vitamin D blood tests. Even though the large, randomized controlled trials that are testing this hypothesis will not be available for three or four more years, it seems to me that the conservative thing to do if you can't get sunlight is to take a physiological amount of vitamin D as a supplement while you're waiting for the result of these studies.

Our recommendation almost since the inception of the Vitamin D Council is to get safe, sensible sun exposure. And on the days you can't, take 5,000 IU of vitamin D a day. That recommendation hasn't changed. Other people's recommendation such as the government and other vitamin D experts, their recommendation has gone up in the last 10 years. But ours has not changed. We think that one can take 5,000 international units a day, and in most cases obtain natural vitamin D levels from that input.

It's important to note that the federal government's Food and Nutrition Board (FNB) reports that no observed adverse effects level (NOAEL) of vitamin D is 10,000 IU a day, meaning there's never been a replicated reliable study showing that 10,000 units a day is in any way detrimental.

DM: That's a good point. Many people may not be aware of it. But I remember when you first started your experience with this, you were very concerned because of a study, I believe a very small study published out of India that showed some toxicity at 2,000 international units. The early innovators and pioneers in this were very careful about implementing higher doses. Can you review that study? Because I don't remember the details.

JC: Yeah. That study was a study of patients with active tuberculosis. There's a condition in tuberculosis that's similar to sarcoidosis in which granulomas make activated vitamin D in an uncontrolled manner. Higher levels of activated vitamin D will raise calcium levels. That study, which was not cited in the most recent Food and Nutrition Board paper, was discredited. In fact, Reinhold Vieth wrote a response to that paper that was published. But the authors selected not to answer it, which is a general indication that the authors accepted the criticism of their study.

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Many doctors are now recommending 2,000 units a day. The Endocrine Society is recommending that people have blood levels between 40 and 60 nanograms per milliliter. They say that in most cases, 2,000 units a day will obtain that. But they point out that in some cases, it will not and that you need higher doses of vitamin D to obtain blood levels between 40 and 60 nanograms per milliliter.

DM: Yeah. That reminds me – and in fact it's interesting – that sarcoidosis and tuberculosis are both caused by mycobacteria, I believe. It's interesting, sarcoidosis is the only disease that I'm aware of – and

correct me if I'm wrong – that really vitamin D is contraindicated, either exposure to the sun or oral vitamin D. The reason why eludes me, but it seems you've pretty well documented it. But here's the other component: prior to the introduction of tuberculosis drugs in World War II, the way that tuberculosis was treated was exposure to the sun.

JC: That's correct. Solariums were very common in this country and in other countries in the '20s and '30s. In fact, there's a publication from the United States government in 1931 about infants and suntans. The government recommends that infants be exposed to the sun enough to develop a healthy suntan. That was the recommendation that was made by the federal government in 1931, and we've come a long way away from that.

DM: Perhaps we should send a copy of that report to the current surgeon general.

JC: I'll forward it to you.

DM: That would be nice. I'd love to send it to the surgeon general. But do you have any comments, impressions, guesses, or understanding of why it's not good for sarcoid? I mean, that's been one of the biggest mysteries in vitamin D that I'm aware of.

JC: Well, vitamin D is contraindicated in any granulomatous disease in which the production of activated vitamin D is unregulated. Sarcomas. There are some cases of tuberculosis. There are some cases of other cancers where they have a sarcoidosis-type of problem. But by far, sarcoidosis is the most common of the diseases where you can get high blood calcium from even moderate amount of sun exposure or vitamin D input.

DM: It sounds like a regulatory issue and maybe a defective gene going on there. Potentially we'll figure out the epigenetic solutions or maybe even some genetic ones and have some genetic engineering that could solve these people, because that's a really tough disease. It's like you're between a rock and a hard place. They need this desperately, but they have this genetic – it's not necessarily a defect, but dysregulation that doesn't allow them to use it.

JC: Yes. Dr. Holick I think has had the most experience of anyone in the country treating vitamin D deficiency in patients with sarcoidosis. He tries to slowly get their vitamin D level up to about 30 nanograms per milliliter. He finds he can do that without significant hypercalcemia. Because in sarcoidosis patients, you often have to do a risk-benefit analysis. Which is worse? The vitamin D deficiency or the hypercalcemia?

Actually, patients with high blood calcium should not take vitamin D until the cause of their high blood calcium is clear, in my opinion. High blood calcium is a contraindication to taking vitamin D until the cause of that is clear.

DM: Yeah. In my experience, many times, people with that condition have their parathyroid glands removed, when frequently all that's required is to increase your magnesium, because magnesium counterbalances calcium and can easily lower serum calcium levels. That may just be a calcium to magnesium ratio challenge, not a thyroid issue and having your glands surgically removed.

JC: Yes. I'm sorry, I don't know anything about that field.

DM: Yeah. It's another alternative, the surgical approach, which is irreversible, and they think their saving people's lives.

JC: It's interesting that in those patients who did have their parathyroid glands removed incidentally from having their thyroid glands removed, many of those patients were on 50,000 units a day of vitamin D2. I

don't know if you're old enough to remember when that was common, because to prevent the low-blood calcium that goes along with total parathyroid activity.

DM: Vitamin D2 still is being used. That's the synthetic version. Of course, we don't recommend that; we recommend vitamin D3. It's also the version that you get when you irradiate plant materials. Vitamin D from mushrooms, for example, would be vitamin D2, not D3. And probably still works. How it's obtained is not much of a difference. But to me, it seems the best is to use what your body has rather than use something that it's not typically exposed to.

JC: We agree that when you're treating vitamin D deficiency in humans, you should use human vitamin D.

DM: Yeah. That's pretty simple, not too complicated. Like I said, the more you study these things, the simpler it gets. It's not really rocket science for the most part. A lot of physicians would have you believe it is, especially our current surgeon general, who thinks exposure to the sun irrationally believes is dangerous and that you should stay out of it. Now, that just doesn't make any sense. If you accept that, it does become complicated. You're like, "How am I going to do this?" You're confused.

JC: Yes. Most naturalists think that skin color evolved because of a vitamin D mechanism, that very highly pigmented, shiny, reflective, and black skin is perfect for living around the equator. But 80,000 years ago, when we started migrating away from the equator to more poleward latitudes, there was a natural selection process that was quite dramatic.

People with those skin types could not get enough vitamin D. The women might develop rickets. They would then have difficulty in childbirth. There was this natural selection towards lighter skin. If you look at the skin's melanin content in indigenous people at certain latitudes, there's a high correlation between that, unless the people are getting vitamin D in their diet like the Inuit used to.

DM: Yeah. And you know, a lot of people are opposed to the theory of natural selection, but I think it makes perfect sense here, because you can just look at your own skin. When you go out and get tanned, you can see the radical differences in relatively a short time. In as little as a few weeks, you can have a dramatic skin color difference. It wouldn't be that difficult to comprehend how that could have such a significant change, by people migrating northward or southward, but typically northward.

JC: There's one other thing that I've observed that to my knowledge never has been studied. That's when you have higher vitamin D levels, your skin sensitivity to the sun is reduced. If you have a patient with a vitamin D level of 20 who has 20 minutes of sun exposure versus the patient whose vitamin D level is 70 who has 20 minutes of sun exposure, the skin reacts differently to that sun exposure. That has been my observation both personally and from people who read my blog. But that has never been studied. There is a scientist at the University of California, San Francisco, who is I think currently studying that. There's a mechanism in the skin that might explain that.

DM: Yeah and it makes perfect sense. It really does. That really justifies the strong recommendation and endorsement, to receive most of your vitamin D from safe sun exposure and not be swallowing pills, which as what I stated earlier is what I've been doing for four or five years. When you swallow a pill, there's no self-regulating ability. Your body doesn't have vitamin D receptors in your gut that selectively limit its absorption. But the skin has the ability to control how much vitamin D is being produced based on how much is in the blood.

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JC: There is no question that the natural way to get vitamin D is through sun exposure. Nobody can argue that point.

DM: Yeah. Well, there are some groups, even natural groups who believe it should be obtained from… We had this discussion before. It actually got me kicked out of the advisory board for Weston Price, because of the cod liver oil discussion and their belief that that's a really great way to get vitamin D. Omega-3s are great, but we think there are probably better ways to get it.

JC: Yes. The difference between vitamin A and vitamin D is interesting. Vitamin A is a preformed retinol. It's a hormone. When you take a preform retinol, it's like taking activated vitamin D. You're bypassing the mechanism the body has to control production of the active hormone. That's why we think the best way to get vitamin A is through a reasonable diet, not through expressly preformed retinol supplements.

DM: And a reasonable diet would be one that would be high in beta-carotene, which are the precursor to retinol.

JC: Right.

DM: Your body can synthesize that. No one would disagree with the recommendation to have plenty of fresh fruits and vegetables, which is where typically these beta-carotenes are found.

JC: Yes. And that brings up another point. You often see studies that claim Americans only ate the recommended diet. They wouldn't need supplements. The problem with those studies is who do you know eats six to eight servings of fruits and vegetables a day? It's fairly rare.

DM: It's rare. In my network, it's a high number of people because I have a high number of healthy friends who do that. And I certainly do it.

JC: Yes. But for the average…

DM: But here's the other component of that. Even if you're eating those, you have to be careful of the quality even if you're buying from local organic farmers. It all depends on the nutrient density of that food, which is absolutely related to the health of the soil. There's no simple test that we have yet to confirm that.

Ultimately, it's best to grow your own food. I'm in the middle of a giant experiment. I'm doing that to consume most of the food that I grow. Just basically limiting most of the greens to the ones I'm growing to have this high nutrient density food, which is not available to most people. I mean, it really isn't. Ninety-nine percent or more of the public is not getting high-quality food even if they're eating fruits and vegetables. They just don't.

JC: How many farmers replenish magnesium, boron, or zinc in their soils? It's simply not done. If you look at the nutrient content of foods that is published periodically by the federal government, you'll see many of those studies are old and that it's unknown now, to my knowledge, how much potassium bananas contain.

DM: There are so many foods that have more potassium than bananas. That's funny. There's [inaudible 53:49] of the water. Potassium's important because the sodium to potassium ratio is really a crucial health parameter that very few healthcare professionals look at. It's an easy one to calculate. There are simple apps that you can download. My Fitness Pal is probably the most well-known. You can just enter your diet and it will tell you how much sodium and how much potassium [you're getting]. You can calculate this ratio very easily. It's really distorted in most everyone. You need about three to four times as much potassium as sodium, and it's reversed in most people.

JC: Yes. The other thing that I think is unappreciated is like calcium, serum magnesium and serum potassium are homeostatically controlled. Most doctors know that blood calcium level does not measure total body calcium content. A woman with severe osteoporosis can have a low amount of total body calcium but have a normal serum calcium. They understand that a blood calcium cannot measure total body calcium adequacy. But they don't understand that magnesium and potassium are exactly the same and that they are homeostatically controlled. Serum levels of those two minerals can be normal when total body stores are low.

DM: Yeah. That's a good point. I just want to address one of the comments you made earlier about what farmers are adding to these minerals back into the soil. One of my new passions now is biological gardening. It's kind of like your passion is the vitamin D. I've been studying this quite a bit lately. Really, what my conclusion is that it mostly relates to the microbiology of the soil. If you could optimize the soil microbe, that's a bit of a challenge to do and it's much far beyond the scope of this discussion. But if you can do that…

These minerals are already in the soil. They're just not bioavailable. These microbes will make them available so you could feed them to the plants. It's all about optimizing the microbiological activity of the soil. Typically the fungi, the bacteria, the protozoas, the amoebas, the nematodes, all of those things, they're crucial. This is the complex web of life that exists there. We can optimize it with some simple measures. It's not putting Miracle-Gro on. I can assure you. That is not…

Or these other minerals. Because what they tend to do most of the time, these minerals that you suggested, they're adding the salts. What's the side effect of the salt when they're added to the soil? It will actually kill the very component that's designed to heal the soil, which is the microbes. If you optimize the microbial life, you'll optimize the nutrient density of the food. I'm in this giant experiment I'm doing here for the last year or so. Hopefully, I'll be starting to see some of the results in another year.

JC: Are you going to make the mineral content of the food that you produce?

DM: Oh, yeah. We're definitely doing that. We actually spray some liquid minerals in a foliar application that's extracted from ocean water to sort of catalyze that process. But ultimately, the soil microbes are the key to the success of the whole equation. You don't need fertilizers. You just don't. You don't have to put it. You don't need soil testing. You don't need to put anything back into the soil. You just optimize those conditions. It's just nothing short of a miracle. It's really amazing.

I'm excited about it, because we had 40 to 50 percent of the produce grown in the US was in people's backyards in World War II, in victory gardens. Now, it's a far lower concentration. We have the ability to produce this food. Many people have access to either a community garden or their own yard (a front yard or backyard) where they can do this.

JC: Wow.

DM: Yeah. That's exciting, especially in areas like California where there's a severe drought. Some of these applications like using woodchip covers that work in areas that get less than 10 inches of rain a year. It requires absolutely no irrigation. It's really incredible. It just gets back to natural principles. When you study this… The more you study it, the more you realize it's just like health. The more you know, the simpler it becomes. Am I right?

JC: Yes.

DM: You don't have to measure. You just have to follow nature's path and try to understand what the grand design is because when you understand that and apply it, you'll be able to reap those benefits.

JC: I agree.

DM: I think we kind of went off on a tangent. But I really appreciate your contributions in helping us understand the results of this new study and your comments on the surgeon general's recommendation, putting it in a proper perspective. Because people hear it from me all the time, they're thinking, "Well, it's just him." But another good health professional like yourself, who's really dedicated a big portion of his life to this area, is really appreciated. Thank you for everything you've done, for your continued work on the Vitamin D Council, and for helping more people to understand about the importance of this important nutrient.

JC: Well, thank you for having me.

[END]