A Special Interview with Dr. Robert Corish

By Dr. Joseph Mercola

DM: Dr. Joseph Mercola

RC: Dr. Robert Corish

Introduction:

DM: Welcome, everyone! This is Dr. Mercola. I’m just beyond delighted and very excited to have with us, Dr. Robert Corish, who is a physician and interested in really similar topics as I am.

I first met him a year ago at the Natural Health Expo West in Los Angeles in March, which they have every year. He is a phenomenal resource on one of my favorite antioxidants, astaxanthin. Literally a few months prior to me meeting him, I didn’t even know how to say the word, let alone what it was. He’s had, however, knowledge of this for quite a few years and is really one of the true experts there. I’m just delighted that he’s able to join us and very excited for the information that he’s going to be sharing, because I have had a preview of it. I can assure you, it’s just incredible. Welcome and thank you for joining us, Dr. Corish.

RC: It’s my pleasure. Good morning.

DM: Why don’t you tell our listeners a little bit about your background, how you first became interested in natural medicine, and specifically, how you acquired your expertise in astaxanthin?

RC: Well, I was trained in the conventional sense as a medical doctor here in the United States. I became an anesthesiologist. I’m also board-certified in pain management, and I’m also certified in clinical metal toxicology.

Over the years, I have noticed that younger and younger people are coming for surgery. They’re on greater amounts of medications. So, I have been watching this trend go for the last 10 years, and it was really this that sparked me into investigating.

There’s got to be another way. There has to be something better than our way of bringing people, giving them a pill, and once the pills don’t work there’s some type of surgical procedure. It just dawned on me. We need to be preventing this rather than just treating it. I think this trend was the thing that precipitated my investigation into natural medicine, looking for alternatives.

When I started looking at this 10 or 15 years ago, natural medicine kind of had a little bit of a taboo label attached to it – “voodoo medicine.” But I think that over the last five to 10 years, there’s so much research that has come out in the natural medicine sphere that we are now proving ourselves that we have good clinical data, we have good clinical outcome with natural medicine – that we can really compete the conventional pharmaceutical field.

And more importantly, we can prevent problems happening before they occur. We don’t need the pharmaceutical medication. We have a healthy and better lifestyle. And you don’t end up in the operating room visiting me in some hospital. So, that’s how it really pushed me into studying alternative, healthy, and functional medicine.
My involvement with astaxanthin started about seven years ago. There was a gentleman. He was an organic foods expert. His name is Mark [inaudible 03:07]. He became a marketer for a company out of Hawaii. The company’s name is Cyanotech, and they produce astaxanthin. While I got to know him, he introduced me to astaxanthin. I started looking at the studies of this carotenoid. And I was very, very impressed, because I have never heard of it.

**DM:** What year was that?

**RC:** We’re talking 2006 or 2007.

**DM:** Okay, so that’s relatively recent.

**RC:** It’s relatively recent, and even since that time we have so many more studies on it – over 500 peer-reviewed journal articles on astaxanthin. I have seen in the last five years, many of them are now introducing human clinical studies. We have moved from the animal model, now into the human clinical studies. The results are very, very impressive. They’re only reflecting what we saw in animals that enhanced tremendous clinical benefits.

I have been involved with the formulations with astaxanthin and, basically, educating the physicians and other people about the benefits of this tremendous antioxidant.

**DM:** Okay. We’ll get into that in a moment, but I just wanted to address your transition from the traditional model into natural medicine, which is really quite commendable. It’s unfortunate that such a small percentage of physicians really seem to abandon their curiosity and their desire to really find out the foundational cause, what are the primary reasons why the people that they’re seeing are truly sick. I mean, it doesn’t take a rocket scientist to figure out that very shortly, you know you’re just providing symptomatic Band-Aids, and there’s no way that you perform addressing the cause.

It is kind of surprising to me that more physicians aren’t making this transition. They have just been so effectively manipulated and brainwashed that they’re practicing the traditional model. But I commend you for doing that. Really, that is – in my book and in my view – one of the signs of a really outstanding physician who can really abandon what they have learned and just use the tools on how to learn and reevaluate what their real-life experiences are and modify that based on what their perception of reality is.

**RC:** Well, I also want to clarify that I believe that. Conventional medicine, we shouldn’t abandon it.

**DM:** Oh, sure.

**RC:** Conventional medicine with the functional natural medicine, they should really interface. I mean, if I happen to fall over right now with chest pain and a heart attack, I want to be taken to an emergency room where they can place a stand tall, put me on clot busters. The point is that if I know that I can adjust my lifestyle, which when I eat reduce my stress, definitely cut down on inflammation, the chances of me ever arriving at this point of chest pain and having a heart attack are minimized.
The message is prevention. You don’t want to go down that road. That’s the problem that we have with our conventional medicine. As you have just said, conventional medicine is really not health care. It’s really “sick” care. We allow a person to get sick. We have a problem, and then we do the Band-Aid. We have a prescription or we go to surgery and take something out. But it’s downstream. What you and I are talking about is upstream. Let’s prevent that and have a healthier and a happier life.

**DM:** Sure. Obviously, there are some things that you’re not going to prevent, like acute traumas and such. That’s where traditional medicine just excels. I don’t think anyone in the right mind would dispute the fact that it’s absolutely appropriate to have intensive care in acute trauma centers and such to address that. But the bulk of the health challenges that we’re all going to experience is a result of chronic disease, where the preventive model is absolutely appropriate.

The challenge is that there is a very small number of physicians or percentage of physicians who really understand and appreciate this. It’s likely that someone listening to this or watching this video will not be seen by a physician or have, as a primary care provider, someone who is not really oriented to this model. What would your recommendations and suggestions be to that individual, if they’re seeking to find someone to coach them in integrating these alternative approaches to their healthcare challenge?

**RC:** You know, I wrote a book on men’s health. And men notoriously don’t want like to visit physicians. Women have a better habit of taking care of themselves from a younger age with pap smears. Men do not like to discuss their health problems, and they don’t like to be told by a physician what to do.

So, when men ask me this, I say, “Well, change your physician.” That’s what you’d do if you have a poor mechanic, if you had car problems. If you didn’t like what the mechanic was doing to your car or the diagnostics or the way he fixes your car, you don’t have a problem changing the mechanic of your car. If you feel uncomfortable with your physician, then I think it’s fair to say that you shop around to look for a physician that you feel comfortable with and a physician that will appreciate your views of prevention rather than we-want-to-treat-it-now. Finally, a good physician would be number one.

After that I think nowadays, it’s incumbent on ourselves that we take care of ourselves. We worry about how we’re going to retire, so we’re watching our retirement programs, we’re looking at our money in the bank, and planning for the future. It’s the same with health. You have to plan it. It’s almost like you’re putting money in your biological bank account. So, exercise, stress reduction, lifestyle changes, your dietary changes, and doing your homework – watching shows like yours, going on Google, printing questions and things that you’re interested in, and reading. But prevention is best, and it really is incumbent on the part of everybody to be preventive.

You have to be proactive. You have to go out there and do it. I would start off by finding a good physician and discussing with the physician your philosophies, that you prefer to prevent rather than allowing the wheels to fall of the bus and now trying to fix it. Proactively do homework, due diligence, and adjustment. You have to do it. As Nike says, “Just do it.”

**DM:** Yeah.
RC: Exercise and change your diet. A little bit goes a long way with the body, and people don’t realize that. A little bit of exercise, your body will thank you. It will respond. Your immune system will kick in, your hormones will kick back in, and the repair process. All these things will work with just a little bit of exercising. As you increase your tolerance, you get greater benefits.

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It is action. It’s a call to action. You have to be proactive.

DM: Yeah, if I could just respond to that, because I have been passionate about exercise for about 45 years. I have been doing it since the late 60s consistently. I made some mistakes, and I’d just like to share the mistakes I made that will hopefully provide as an experience that would prevent people from making similar mistakes. I couldn’t agree more. I’m absolutely passionate as you are about exercise.

The challenge and the finetuning, though (in my experience), is to understand that the diet is actually more important. Yes, you’re doing both. But if you’re eating a poor diet, you’re making poor choices, having unhealthy fats, sugar, and processed foods, then you are not going to maximize the benefits of exercise and you’re certainly not going to optimize your body density and lose weight. That’s the key.

But then even when you’re in the exercise, there’s – in my experience and I’m sure you have seen it, too, when we’re travelling and using fitness centers in the hotels – 80 to 90 percent of the people who are exercising are using the traditional cardio aerobics. Yes, it’s certainly better than sitting on the couch and doing nothing. But you know, just for actually less effort, maybe not less effort but less time certainly, in high-intensity exercise like the thing we call Peak Fitness, you can have a profoundly exponential benefit with just trying to do that.

The devil’s in the details, so I just want to emphasize that I couldn’t agree more than exercise. But the application is really so crucial on how you do it.

RC: Absolutely, balance. Everything is balanced – exercise, your dietary choices, supplements, stress reduction. We are what we eat, drink, think, and do. So it’s a good creed. It’s a balance, and it’s a real program.

DM: Absolutely. Speaking of those, you mentioned earlier that you had written a book, *A Guide to Men’s Health*, so why don’t you tell us about why you wrote that book and some of the important topics that are in it?

RC: Yes. This happened about three years ago. I know you experience this as a physician. Every time you’re at a family gathering or a cocktail party, you usually have somebody come over and ask you a medical question. They’re very apologetic, “Do you mind if I ask you one question?” This has happened for years and years. A lot of men would come up and ask me private questions and medical issues. And I would give my advice of what I thought they should do.

At one point, I just decided, “Let me see what resources are out there.” There are not a lot of resources for men – not written in men’s language. So, I decided to write a book on men’s health. It’s *A Guide to Men’s Health*. It answers the questions all men should ask their doctors, and it really deals with all the things that the guys really come up to ask me, you know. How can
I prevent a heart attack? How can I prevent Alzheimer’s? What’s this about anti-aging, male menopause, hormones? What tests do I take? When should I take these tests? What’s normal? What isn’t normal? Nutrition – what’s considered a good nutrition? What vitamins should I take? Why should I take vitamins?

I put this book together. It’s written in men’s language. It’s in a format the way men think. You ask a question, and we just want short answers. So, this book is really questions, “How can I prevent a heart attack?” I have written, “These are the steps you need to take to prevent a heart attack” with a little bit more detail, but it’s easy to understand. There’s humor in it.

It was a project that I wanted to do. I have completed that. Now I have moved on to my next project. But yeah, I think the impetus was just men coming up and asking me questions and realizing there wasn’t really a great resource out there for the layperson and for the general men to read and understand.

**DM:** Terrific. I’m glad that you put that together. Do you have plans on doing one for women in the near future?

**RC:** Yes. Yes. Women are a little bit more complicated and require a little bit more research. But then, that’s the plan. I hope to have that one soon.

**DM:** Terrific. Well, let’s go to a topic that’s near and dear to both of us, which is astaxanthin. It’s a mouthful to pronounce, but once you have done it a few times, it kind of rolls off the tongue. As I said earlier, it really is one of my favorite. It’s almost one of the few supplements that I think almost everyone could take, because we’re all exposed to these chronic degenerative conditions where oxidation is such a powerful and potent influence. This is one of the premier antioxidants that are out there.

I’m wondering if you can tell our audience – because I have never heard anyone articulate this better than you – what astaxanthin is and where it comes from.

**RC:** Astaxanthin is a plant pigment, and it’s in the same family – the carotenoid family – as beta-carotene, lycopene, and lutein. It comes from the same family of carotenoids. The carotenoids are responsible for giving our plants and fruits their vibrant, bright colors. So, oranges, the yellow of squashes, zeaxanthin, green in spinach, and obviously, orange in carrots. Astaxanthin is a blood-red pigment.

We can obtain astaxanthin from a variety of sources. Up the food chain, you can attain astaxanthin from salmon. You can obtain it from krill, from shrimp, from red trout, fungi, and microalgae. Of all these sources, the microalgae are the most potent. In fact, when you think about it, the krill, the shrimp, and the salmon eat the marine microalgae, so as to obtain their astaxanthin. It’s – in my thought – much better to go right back to the source, which is the microalgae.

That particular microalga is called H. pluvialis. It’s an alga. What happens is this alga, when it’s on the stress (and the stress could be excessive sunlight, a change in the pH of the water that’s it in, or maybe a lack of nutrient, a phosphorous, etc), what it will do is it will manufacture this carotenoid – astaxanthin. This astaxanthin will then create a dome of protection over the algae, so as to protect from the crisis at that time, whether it’s excessive sunlight or not. And it will
absorb the free radicals and protect the algae from injury. Once the crisis has passed, the algae will reappear and get on with their normal life cycle.

It’s a wonderful antioxidant. It is well-documented that these algae can survive up to 30 years in times of drought without water. So you imagine, 30 years without water. When the water reappears, the microalgae miraculously reappear and continue with their life. That’s the type of antioxidant capacity that these microalgae can produce with the astaxanthin. Imagine having that kind of antioxidant payload within the body. Now we can through astaxanthin in supplements. That basically describes the different sources where we can receive it from.

To give you an idea of the differences in the potency, and this is another reason why I prefer the marine microalgae. When you take gram per gram of the sources, so salmon – one gram of salmon, it will contain anywhere from five to 40 parts per million of astaxanthin. If you take krill, it contains 120 parts per million, okay? And shrimp, about 1,200 parts per million. When you take that same microalgae, when we go right back to the original source, the original manufacturer of astaxanthin – gram per gram, it’s 40,000 parts per million. So, it’s far more concentrated, and it’s far more potent in the microalgae source. Obviously, that’s my preference for my source of astaxanthin.

**DM:** Terrific. I’m just curious about the benefit of surviving 30 years without water for the microalgae. If there’s any studies that had actually isolated that benefit to the astaxanthin specifically. Like maybe, they have knocked out the gene that’s responsible for producing it and see if they still can live those 30 years or, you know, some other way to discern whether or not that’s the primary responsibility for that.

**RC:** There’s an evolutionary component. There’s no doubt about it. But if you think of 30 years of free radical assault on those microalgae, there still needs to be that dome of protection. And astaxanthin is such a strong and powerful antioxidant that it can provide that dome for that amount of time. It’s a great question that you asked, and it needs more than one component. But it definitely needs the antioxidant component, so as to absorb and neutralize the free radicals. Otherwise, it’s dead in the water; it’s dead without the water, so to speak.

**DM:** That’s a good point. I’d just like to mention another comment on that topic while we’re discussing it. I have heard other experts describe this as a force field that sorts of get generated, which I think really provides a good metaphor for people to understand it. Specifically, because a lot of our sources or especially when the sun, which we both entirely recommend as a way to get out vitamin D or as a source of vitamin D. One of the downsides of that is, of course, going to be this oxidant stress, specifically from ultraviolet light.

I’m wondering if you could maybe, expand a bit on this force field that gets generated and some of the physics involved with respect to the ultraviolet [inaudible 19:41] with the astaxanthin specifically and sort of dissipating that electron-damaging stress.

**RC:** Sure. Astaxanthin is a very unique molecule. In fact, it’s being described as the king of carotenoids. I would say that it’s the king of antioxidants.

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It is a very, very unique molecule in the fact that where it positions itself on the cell membrane, it
spans across the cell membrane rather than longitudinally. So, there’s a portion of the astaxanthin on the exterior of the cell, a portion on the interior of the cell, and then this portion that spans across the lipid layer.

What this translates to is it offers protection on the outside of the cell from free radicals, the inside of the cell where there are free radicals being generated, and also this lipid fat layer where we always hear about lipid pro-oxidation. Just a position of the molecule is just at perfect… It’s perfectly designed to protect all parts of the cell. That’s extremely unique.

Another point that I’d like to emphasize is that with vitamin C6 or vitamin E, which also likes to sit outside of the cell membrane and usually in partnership with selenium. We have tocopherol selenomethionine complex on the outside of the cell. So, it likes to grab free radicals and neutralize them on the outside of the cell. But it doesn’t really extend to the inside of the cell. It’s another advantage that astaxanthin is really very global when it comes to cellular protection.

Here’s the point that I wanted to make. Most antioxidants, the ones that we know of – vitamin C, vitamin E, and various others – usually, it can only handle one free radical at a time. Vitamin C can handle one free radical and neutralize it. Vitamin E can usually handle one free radical at a time.

Astaxanthin can handle multiple free radicals simultaneously. Why it can do this is it forms an electron cloud around the molecule. It’s known as the electron dislocation resonance – big fancy word. What happens is this cloud that’s floating around the astaxanthin, when free radicals come in to steal electrons, rather than a one-on-one, it’s just absorbed into the cloud, neutralized, so it’s harm is being diffused, and the energy is diffused as heat.

However, astaxanthin can handle multiple types of free radicals. Certain antioxidants can only handle one at a time, and they only have a preference to one type of free radical – a singlet oxygen free radical, a nitric oxide free radical, or a peroxyl free radical. So, everyone has a bias. Astaxanthin can handle multiple types. It can handle different species of free radicals and it can handle multiple free radicals simultaneously, all at the same time. This is unique and is really why – I think – astaxanthin is the most powerful antioxidant that I know of. It’s the most natural one. It speaks for itself.

We have got plenty of studies, and Nishida’s had been comparisons between vitamin C, resveratrol, and vitamin E. I’m not a big fan of (we can talk about this) the ORAC value, but astaxanthin as being shown to be 6,000 times stronger than vitamin C, 500 times stronger than vitamin E, 3,000 times stronger than resveratrol and quercetin. This was done by a very reputable scientist, Nishida. He was using three different types of free radicals.

When we compare different antioxidants, we actually do have a frame of reference from Nishida’s studies and another guy called Bagchi from Creighton University, who compared head to head the singlet oxygen quenching ability, which is a free radical, between astaxanthin, green tea catechins, resveratrol, and all the antioxidants.
Really, astaxanthin eclipsed the other antioxidants, because of these factors that we’re talking about. It can handle more free radicals simultaneously when you can only handle one or two. It could handle multiple species. So, it really is in a class of its own. When we compare it with other antioxidants, I really astaxanthin is the strongest that we have so far.

Right now, the studies and the clinical research that’s going on is proving that it’s the strongest antioxidant. We’ll wait and see how as time progresses, I’m sure we’ll discover more natural antioxidants out there in nature. But astaxanthin really is the king at this point, because of its unique molecular structure and its tremendous capabilities of diffusing so many free radicals.

**DM:** Thank you for explaining that. Every time I listen to you speak of this, I learn more. I really appreciate that description. For our listeners, I just want to highlight an important component of this that may have been overlooked. When you referenced the traditionally acknowledged and recognized antioxidants like vitamin E and vitamin C, which, of course, astaxanthin is so much more potent, is true that those only work once before they essentially become oxidized?

**RC:** Yes.

**DM:** And that they need to be recharged usually by things like ubiquinol or coenzyme Q10. I’m wondering if you could go over that process and expound on it to help put a better perspective on the topic.

**RC:** Sure. Let’s go back a step. Let’s explain what a free radical is. We’ll talk about antioxidants. Then you’ll be able to see the differences in the capabilities of the different antioxidants. A free radical – my definition of a free radical – is a toxic, unstable molecule that attacks and steals electrons from other molecules. Those other molecules could be our DNA. They could be enzymes. They could be critical proteins within the cell. So, they inflict damage on the cell. Not only that, they actually trigger chain reactions. All of a sudden when we have these dangerous, toxic free radicals come again, now we have a chain reaction. We have a tsunami of free radicals stealing electrons from our cellular parts. The cells become dysfunctional. They die, and this leads to health problems. We’re talking about cancer, inflammation, heart disease, and the whole gamut of medical problems. The point I’m trying to make is that it all begins with the free radical.

Now, this process by which these free radicals cause damage to cells is called oxidation. When we talk about antioxidants... And an antioxidant is a substance that stops free radicals from causing damage to cells, hence the name antioxidant. So, the process of damages of oxidation, the protection of it is antioxidation. Now we have a group of natural nutrients that we know will neutralize and mop up these free radicals. We call them antioxidants.

Now I’m taking again, vitamin C and vitamin E. They can handle one free radical at a time and neutralize them. The free radicals being taken care of, but now vitamin C and vitamin E are being exhausted. They have become exhausted, they’re tired, and they cannot go on to grab another free radical. So, you’re right. They now need to be recharged. And there are other antioxidants and co-factors such as ubiquinol, glutathione, and alpha lipoic acid. Even vitamin E at times will help to recharge. They work as a team.
Depleted vitamin C may be recharged by vitamin E, alpha lipoic acid, and ubiquinol (as you just said). They all handle the oxidized portion. Now vitamin C can go back and grab another free radical. These other antioxidants really become exhausted.

Another point is that at some times, the antioxidant that has become depleted and exhausted actually proceeds down the line and now becomes a pro-oxidant. It can actually switch teams and become a free radical itself, which is harmful. Astaxanthin never ever becomes a pro-oxidant. It might become completely used up, but it doesn’t continue down the road and become a pro-oxidant. It never becomes a free radical. With the astaxanthin, another feature is it remains benign after it has been used up, and it has greater capacity compared to the other antioxidants, which can only handle one at a time, and they become exhausted.

This is really why we need to take vitamins, supplements, and antioxidants on a daily basis, because we deplete our reserves. Once you deplete on your reserves, then we have a problem with the free radicals versus antioxidants. It’s a numbers game. Once the free radical members are elevated and you don’t have enough antioxidant reserve to neutralize them or mop them up, these free radicals are now going to cause cellular damage, and cellular damage leads to disease – heart attacks, cancers, autoimmune disease.

That’s the whole pathological process. That’s why we’re concerned about free radicals. That’s why we need antioxidants. And that’s why we need to choose the correct and most potent antioxidants, so as to definitely build up our reserves and know that we have got that defense system.

DM: Thank you for that very eloquent description. I have listened to the oxidative process and free radicals explained by many people. But it clearly is one of the best descriptions that I have ever heard, because it describes it in such an easy to understand term. You have really mastered the metaphors there. Thank you for that.

Now, with respect to it being used up, I wonder if you could comment on that.

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Because it is a bit of an area of confusion for myself – and I’m sure many others – that it clearly has a far expanding capacity of traditional antioxidants. But is there any way to know that once used or a way to know that it’s used up, or typically what’s the range? How many times can it – I guess – neutralize a free radical before it’s not useful anymore?

RC: Yeah. That’s a great question. That is an excellent question. We, at this point, do not know at what point it is used up. So, what we would consider therapeutic levels. This is an evolving field. It’s similar with vitamin D. We started at one point saying, 200 IUs, then it became 1,000 IUs, and then 5,000 IUs, and now, I believe it’s anywhere from 7,500 to 10,000 IUs of vitamin D a day. It’s very similar with astaxanthin. We started with two milligrams. It went to four milligrams. Now we’re finding that there are certain conditions require 12 and 16 milligrams at times.

This is an ever-evolving field, and I think at some point we’ll find out. It’s very dynamic. It’s not a static process. It’s not an antibiotic where you give this amount of antibiotic and you get these fixed results. It’s an evolving field. We do not have the tools to measure the amount of depletion
that occurs in the body, the half-life of it. We do know the half-life, but we don’t know when it’s completely done. It’s exhausted. Just like anything, we know that once it’s exhausted, it just isn’t immortal, so you need to replace it.

Astaxanthin, once it becomes exhausted, will convert into what we call astraxin, which is a benign byproduct. It’s an astaxanthin that has done its job. It’s very tired and ready to move on. It doesn’t do any harm to the body. Now when we produce, we take more supplements, we’re introducing the fresh astaxanthin that can handle multiple free radicals, and some cases more than 19 at the same time.

So, it’s got a greater capacity for the amount of free radicals and also the longevity when compared to vitamin C. Because vitamin C is depleted very, very quickly, it needs to be replaced very quickly, and astaxanthin will definitely eclipse this performance. But we do not have blood test at this point that will measure while your astaxanthin levels are low.

DM: I’d just like to address the potential toxicity. You made it really clear that it does not appear to have any, but I’m just personally curious – this metabolite effort used up is astraxin, if it has been documented that the body recognizes that, it has no longer any benefits, and there is an active excretion to remove it. Because if it’s not, it would seem that if you’re taking large amounts, there could be some potential concern about the buildups of the metabolites.

RC: Well, a gentleman called Dr. [inaudible 33:10] of Georgetown did lots and lots of these and found that it was absolutely harmless. Hoffmann-La Roche did extensive studies on astaxanthin. They did testing on acute toxicity. They did testing on teratogenicity, embryological toxicity, and reproductive toxicity. They found absolutely no harm or whatsoever. What the body will do is that it will go to the liver. The liver will repackage it, reassemble it, and then it’s ready for excretion.

The only side effect that we’re aware of is that if you take high doses – and I’m talking about 50 milligrams a day – you might get an orange hue in your skin, because it does have a bias and it has a propensity to go to your subcutaneous tissue, if it’s a fat-soluble supplement. So, you might get a slight orange hue on your skin. Nothing to cause alarm, but that’s with very, very high doses. That’s the worst complaint that we have ever heard of, and that’s once again with very high doses.

But it never becomes a pro-oxidant, so it doesn’t switch teams and become a free radical. We know it doesn’t cause any mutagenicity, so we’re not worried about cancer. We’re not worried about reproductive toxicity. There’s no acute toxicity to the liver. It doesn’t become a vitamin A, so we don’t get vitamin A osis.

Plenty of definitive studies have shown that it has an excellent tolerability and safety profile. The FDA generally regarded it as safe. It fits into the same category as all the safe supplements. We’re very confident that we have a wonderful carotenoid without side effects.

DM: Thank you for describing that and providing that reassurance on this toxicity. The times that we have posted articles on astaxanthin, there have been a number of what I would say dissenting comments that I believe really highlighted what’s best described – from my view – as an urban legend or an old wives’ tale. I don’t know who started it, but perhaps you could share some insights on this, that it has some negative adverse influence on male hormones. I don’t
recall the specific concern, but it had to be some hormonal component. I think that Dr. Weil was part of the process of promoting it, from my understanding. I’m wondering if you can comment on that.

**RC:** Well, my only comment on that is I have probably read 400 of the peer-reviewed journals of the 500, and the only other 100 are really in Japanese, but I have read the abstracts of those. And I have not seen one dissenting gap or any paper that would say that it adversely affects hormones. I have been personally taking it for 10 years, and I have never seen that article on its negative effects. The International Carotenoid Society does great work on really looking at the different carotenoids. They produce great data and a lot of information.

Obviously, astaxanthin is a hot subject, because it’s the new hot antioxidant. There’s plenty of data out there, and I’m not aware of any that says it affects hormones, liver enzymes, and kidney function. In fact, the adverse is that we think it helps kidney function, protects the liver from oxidation and inflammation. So, I’m not aware of that.

**DM:** Okay. Thank you for that reassurance. The other point that I’d like to emphasize and I’m sure you would agree is that it’s very easy to get psyched about astaxanthin. As you could obviously tell from your passion and when I have talked about it in the past also. We want to balance it with the common perspective. Especially, many people know that natural medicine is… In America, there’s this tendency to look at it as a magic pill solution for a problem, because of the reliance and the traditional approach is to take a pill for a problem. That may be useful, certainly even with drugs, and certainly far more safer with supplements.

It really isn’t the ideal approach. I think you would agree that supplements are just that. They an addition to a healthy diet. I’m wondering if you could comment on that and the fact that it really isn’t a magic pill. In fact, there’s probably a synergism between the other antioxidants and, of course, the use of a whole diet, which has nutrients that I’m sure we haven’t even discovered yet. Realistically, we’re pretty ignorant in figuring out the whole human biology. We have got a long way to go before we even begin to appreciate it on a deeper level.

That’s my concern. I just wanted to make sure that we weren’t promoting a concept that had people relying on this as a magic pill.

**RC:** Yeah. You’ve nailed it. It’s balanced. It’s lifestyle. It’s appropriate nutrients, exercise, stress reduction, and minimizing inflammation. It really is what we eat. So, we need to choose carefully the foods we eat.

Unfortunately, in our modern day, fast food, speed-ahead lifestyle, and most of all food is over-sterilized. It’s over-processed. It’s being stripped of all its nutrients, vitamins, and goodness by the time that it gets to our table. This is why we do need to supplement. As you have said, it really is just to supplement the lack of nutrients from the food that we take every day. The best way to obtain your antioxidants is really through foods. We do take supplements just to make sure that we have got those benefits that might not be in our food because of the processing.

As you mentioned, it’s not just one single antioxidant. Obviously, astaxanthin is my favorite. Because it’s the most powerful, I definitely want it on board at all times. But there are varieties of antioxidants. We have got vitamin C, vitamin E, vitamin A – the traditional antioxidants. Also, minerals are very important – our magnesium, our zinc, and our selenium, which have
tremendous antioxidant properties as minerals. Then we can go on to the flavonoids – the polyphenols and the catechins from green tea. So, it’s a whole team of antioxidants that work synergistically – as you have described – working together against free radicals.

The other thing that is important to mention is that rather than conventional medicine, which will say, “Here’s a pill for your acid in your stomach, your irritable bowel syndrome, or your blood pressure”… As you know and as you and I both propose is that network pharmacology (we call it network pharmacology) is far better than the conventional approach.

Network pharmacology influences multiple overlapping pathways that share similar functions. When we talk about network pharmacology, we’re talking about nutrition. We’re talking about the natural approach of antioxidants, food, and healthy nutrients. They provide a very, very broad, unified healing approach rather than the conventional, which is a single target, single mechanism, and single outcome.

With the network pharmacology and with these overlapping processes, it allows the cells to readjust, to repair, and to remodel. So with the network pharmacology approach, we get more of an adaptogenic approach rather than the single blocking effect of conventional medicine.

I feel that this unified, broader healing response is safer. It’s effective, and it doesn’t have the side effects. That’s why I like the approach of multiple supplements – of course, the right ones – combined with the right type of diet and good beverages. That really produces this network pharmacology that’s natural and has a much safer and very effective approach towards health rather than just taking a single pill.

DM: Okay. Thank you for confirming that and sort of emphasizing the perspective that this is not a magic pill. So that when we talk about our next topic, which is what it’s actually useful for (I mean you have mentioned a few things, but we have been going to more detail now), that we have that perspective that this is not a magic pill, that diet and exercise is really crucial and along the other items that you have mentioned. If you could outline and identify the key areas where it’s useful and then also maybe you can mention the dosages.

Let me just comment, too, that primarily because of my discussions with you, I have actually increased my own personal doses to the point of six milligrams a day now. And I may increase it more. The typical dose [inaudible 42:21] is two milligrams. But I think there’s this emerging evidence that suggests that the dose needs to be higher a little too early. I believe that we are actually in the process of introducing a higher dosage to make it easier, so people don’t take so many pills. If you can comment on the indications and the dosages, that would be great.

RC: Well, astaxanthin has already shown that it can affect a variety of different clinical conditions and health conditions. It showed a lot of efficacy in cardiovascular disease. We talk about cardiovascular disease. There are studies from Yoshida, Park, and Fassett that have shown that astaxanthin at 12 milligrams per day can increase your HDL cholesterol, which is the good cholesterol by 15 percent. It can reduce triglycerides by up to 25 percent. More importantly, it can reduce your C-reactive protein, which is a biomarker for silent systemic inflammation. It’s been shown to reduce that by 21 percent.
So, as a cardiovascular dose, we tailor to 12 milligrams, because that what the studies have shown to be efficacious.

It’s also being shown to be very useful in joint pain caused by inflammation. There are some excellent studies out there by Spiller and other researchers that have shown that it reduces nuclear factor kappa beta, which is the master switch that turns on the whole inflammation. It reduces tumor necrosis factor and other pro-inflammatory cytokines that causes inflammation, pain, and feelings.

There’s one study that even took patients with rheumatoid arthritis, which has to be the worst of all the arthritides. We have osteoarthritis, psoriatic, lupus arthritis, but rheumatoid arthritis really is disfiguring and very, very painful.

**DM:** I might suggest that scleroderma might be worse.

**RC:** Well, scleroderma, I’m not sure.

**DM:** *[Laughs]* It’s a little worse. I take care of a lot of R.A. patients, and that was a challenge for me – scleroderma.

**RC:** Every inflammatory process is not good and has its own ranking. But when they took the rheumatoid arthritis patients and placed them on four milligrams of astaxanthin, these rheumatoid patients reported an 85 percent improvement in their pain score, 60 percent improvement in their mobility, and almost 30 percent improvement in their gastrointestinal comfort rather taking NSAIDs and prescription medicines.

I thought that this is the important point of this group of people with rheumatoid arthritis: 60 percent said it was just as effective as their prescription medicines. That’s some power right there, and we’re talking four milligrams a day. It has shown a lot of influence in joint pain with inflammation.

It’s shown efficacy in eye health. I know that you have shown this on your website. Dr. Tso (it’s spelled T-S-O) has done a lot of research to show that it protects the retina from free radicals. It has helped to retard the formation of cataracts. And the big thing is that it really is important in protecting the macula at the back of the retina that covers the fovea, where there’s a high concentration of photoreceptors. That’s really responsible for your sharp and fine eyesight. We all know that. Age-related macular degeneration is the number one cause of blindness here in U.S.A. for people who are over 65 years old. And we don’t have a cure for it.

It’s caused by free radical damage, especially from blue light in the whole spectrum of light. It breaks down the macula. And if you could think of the macula as being a little brake pad that sits right in front of this fovea, this very sensitive area. This brake pad actually protects the fovea from these incoming free radicals. It’s still protected. Once this wears down and becomes warn, this is macular degeneration. It causes blindness.

We now know that lutein, zeaxanthin, and astaxanthin really, really protect that macula from further deterioration. It has a very, very exciting future for the protection of our very precious eyesight.
**DM:** Would you suggest believing that astaxanthin is the most potent of all those three, and that astaxanthin is not only useful, of course, for prevention as you mentioned, but actually useful as therapy if you have age-related macular degeneration?

**RC:** If you have age-related macular degeneration, you have got to be very careful not to make a claim that it’s a cure and that it would arrest it. However, if it was my family member who came to me and said, “I have just been diagnosed with early age-related macular degeneration,” I would definitely want to begin a series of steps to prevent this from deteriorating any further. It would definitely include astaxanthin, and I would also include zeaxanthin and lutein where the original studies utilize the other carotenoids.

They’re all in the same family, and we know that vitamin A is very good for the eyes. So, the carotenoids have a propensity to protect the eye. When we compare astaxanthin, lutein, and zeaxanthin for their free radical capturing ability, astaxanthin eclipses its carotenoid cousins. However, having said that, I would definitely want to have a formula with all three. Keep the family together. They help each other out. Now we’ll have a better teamwork in fighting these free radicals that come in.

But Dr. Tso did this direct head-to-head comparison and showed that astaxanthin is far more potent in its protective abilities of the macula. Once again, I like this network, this teamwork phenomenon. It’s got a proven effect.

**DM:** What type of doses are you talking about for prevention and then for treatment?

**RC:** For the eyes, I think six milligrams would be the level that I’d stop at, but it’s anywhere between four to six milligrams for eyes. When we were talking about the joint failure, I think it’s anywhere from four to eight milligrams. When we’re talking about cardiovascular disease, the study shows 12 milligrams.

Then there’s another application. Last year, in the *British Journal of Nutrition,* there was a study on cognitive decline. There was a study on Alzheimer’s. Another property of this incredible antioxidant is that it passes through the blood-brain barrier. It now offers us protection to the brain, the spinal cord, and the central nervous system. As you know, free radicals are responsible for causing strokes, cognitive decline, and dementia. So, we really need some type of antioxidant that can definitely pass in there and give us some protection. Astaxanthin does just that.

We have found that there is an abnormal accumulation of hydroperoxides within red blood cells in people who have dementia and Alzheimer’s. We now know that if you give these patients astaxanthin, the amount of peroxides – these harmful free radicals – is reduced by 50 percent. That’s a significant reduction, and that is at a dose of 12 milligrams. This came out a year ago in the *British Journal of Nutrition.*

Later we searched it to say, maybe, maybe the introduction of astaxanthin may help to prevent (they’ll be careful with the claims) cognitive decline and Alzheimer’s by reducing these abnormal free radicals, these hydroperoxides by 50 percent.

[----- 50:00 -----]

The recommended dose for cognitive and brain health is also 12 milligrams.
On the same length, it was a study that came out of the *Journal of Neuroscience* in Japan, who placed patients on astaxanthin. They noticed an improvement in immediate memory and concentration. I must qualify that this was astaxanthin combined with DHA – the omega-3.

So there again, you see this network pharmacology. But astaxanthin was the antioxidant that was chosen for this. We can definitely see that it has great antioxidant protective abilities for the central nervous system and probably the most important organ – our brain. That is just another application that’s well-documented. This is ever-evolving.

You’re taking six milligrams. I encourage you to mainly bump it up to 12 milligrams.

**DM:** Really? Is that what you’re taking?

**RC:** Well, I take 12 milligrams. I want to have this essential nervous protection. I want the cardiovascular protection and also because of my activities. I have increased energy. It protects my mitochondria.

You know, we are bombarded by such an amount of free radicals. The free radicals that come from the environment, that’s in our foods, pesticides, herbicides, environmental smoke, and excessive sunlight. If I know that I’m going to be out playing golf for more than a couple of hours, I definitely want some protection. And astaxanthin provides that internal protection. I think 12 milligrams really covers everything.

If you want to just take it as a general antioxidant coverage, I believe between four and six milligrams will be adequate. If you want it for skin, two to four milligrams would be adequate. Once again, depending on the condition that you are really trying to target, you can tailor your dose.

**DM:** Interesting. One of the other benefits, too (and I’d like you to discuss this), with respect to providing similar protection against sunburn, sort of an internal sunscreen, you can take it when you’re flying. A number of people watching this certainly have to fly for whatever reason, primarily related to their occupation I’m sure. And when you do... I’m wondering if you have looked at this or have any thoughts on the dose for that. Because it should provide similar protection from other types of radiation like gamma radiation and others that you are exposed to when you’re flying at 35,000 feet that you aren’t typically exposed to at ground level.

**RC:** There have not been any studies with astaxanthin with regards to air travel and this increased radiation exposure by air travel. But outside receiving photons from the sunlight, it’s without a doubt. As you have mentioned, it usually takes twice as long. If you have astaxanthin on board, it will take twice as long to receive a usual burn than people who do not have astaxanthin. It prolongs. You have got some kind of protection. It accesses an internal filter.

There’s an interesting point that you have just brought up here. Just to really give your audience an idea of the damage that flying and being exposed to free radicals and radiation in plane, they did studies on people and measured their vitamin C levels before they get on the flight and after they got off the flight. When they finished and they were at their destination, across the board their vitamin C levels were completely depleted. It’s just showing you that their vitamin C was being eaten up all the way during that flight for protection. This is maybe a source of free radicals that we’re not very aware of.
As I said, a general coverage would be anywhere from four to six milligrams for your antioxidant coverage. If I’m going out in the sun, I’d take 12 milligrams. I think I’m well covered with that. But if I’m going out in the sun, I’ll make sure that an hour or two before, I have astaxanthin on board, so as to protect me from the ultraviolet A and B.

The interesting part about this, and you have mentioned this on your site, is that as we put sunblock on, we actually block the sunlight, the actual photons UVB responsible for creating vitamin D. We have to keep it balanced. But if you have to be outside and you don’t want to create a sunburn and inflammation on the skin, which now is really aging or photo aging, then astaxanthin is a good idea as an internal protection.

**DM:** Well, my guess is – and this is just a guess – that the UVB exposure from the sun that’s actually responsible for generating vitamin D occurs more superficial in the epidermis, and that the astaxanthin is providing the benefit at a deeper level. Because it’s systemic, it’s not going to necessarily screen and limit the body’s ability to produce vitamin D from exposure to UVB. That would be my guess.

**RC:** The way that vitamin D is created in the skin is the ultraviolet-B rays will penetrate through the skin. They will stimulate cell 7-dehydrocholesterol, and stimulate the cholesterol to become pre-vitamin D, which as we know, runs after the liver, becomes hydroxylated, runs down to the kidney, becomes second-hydroxylated, and then we have calcitriol (1,25-dihydroxyvitamin D). It is important that we get enough sunlight to produce this. And 15 minutes of good, intense sunlight on arms, legs, face, and back should be able to do that every day.

The vitamin D is actually made just above the dermal level. It’s right in the dermal level – the dermis. We all know that the skin has multiple levels: spinosum, granulosum, all these lucidum, and all these various levels. It’s a graduation off to be and sloughed up. New skin cells are being made constantly.

We lose 40,000 skin cells every minute. And these new skin cells are all made in the dermis. The dermis is really the engine room of the skin. It is really critical that we protect this level. This is where the collagen fibers are. This is where the fiber elastin bundles are. This is the connective tissue. This is the whole support system for the skin. So, this is where astaxanthin tends to concentrate. This is where the cholesterol levels or also the fat levels are, just below that.

I like astaxanthin because it layers out there, and it will absorb these free radicals. As the ultraviolet-B rays could create tremendous amount of free radicals also. They’ll be neutralized. They’ll be mopped up before they can knock out these supporting structures. And that’s why we like astaxanthin as an anti-aging. Asian ladies eat astaxanthin up, because they have known about it for years. The astaxanthin will capture these free radicals before it hits the collagen.

This is the way I like to describe it. Imagine the collagen fibers in the dermis are like the framework of a house. The ultraviolet rays will come out, come through the air, come through the roof, knock out these fibers, and so the framework will fall down. When you knock down this collagen and elastin fibers, the whole skin layer will collapse in, just like the roof and the walls will fall in if we knock out the framework of a house. That is the anatomy of a wrinkle, a fine line.
If we can grab these free radicals before they can actually impact these collagen fibers, these elastin strands, we maintain a support system, and the skin tonicity and flexibility will stay there and we do not get wrinkles. There’s a great side effect, the women in Asia and Japan already know about it. They take astaxanthin every day. It’s another side benefit, an anti-aging effect if you like, all because of its antioxidant ability to grab these multiple free radicals.

**DM:** Yeah. It’s an interesting observation of human behavior or psychology (I guess would be more accurate) that what seems to drive people or motivate them is more of the cosmetic component. It’s a lot easier to position this and encourage people to take it, if they’re going to have radical improvement in the way they look versus some theoretical benefit 10, 15, 20, or 30 years on the road that’s going to slow down their aging process.

**RC:** That is life.

**DM:** [laughs]

**RC:** No. It’s like when I tell men to take vitamins. They say, “Well, I have been taking vitamins, and I really don’t feel anything different.” I used the metaphor of the car. I said, “Do you have your car have an oil change?” They say, “Every 5,000 or 3,000 miles, I bet you.” I say, “Okay. When you finish that oil change and you drive out of that mechanic’s office, does the car drive any better? It’s not a trick question.” They said, “Well, not really.” So I ask, “Then why do you get the oil change?” They say, “Because it’s doing good for the engine.”

This is what we’re trying to teach our audience. Sometimes you don’t get back the great feeling. But you know that it’s doing good for your engine. You know that your body is working better with it. It’s thanking you. The immune system is working healthy. The cardiac system, your circulation, all these different systemic parts come together.

But you need to give them the nutrients, the building blocks, and the lubrication to function perfectly and to achieve optimal health. Unfortunately, you have just said it, cosmetics and our appearance always seem to win out over functionality.

**DM:** [laughs] It’s not sort of bad. It’s just a reality of life, and understanding that is helpful – I think – for any practitioner who’s listening to this.

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It may be wise to copy or borrow the metaphor that you used with car oil, which I think is brilliant. But also to recognize that that’s what motivates people, to really engage them at that level and so that they’ll do what’s good for them at a deeper level. I just think it’s important to understand that and appreciate it.

You have really enlightened us as to the benefits of astaxanthin. It’s really kind of surprising (I’d like your take on this) why more people aren’t aware of this, especially healthcare professionals. I only recently became aware of this. It’s less than two years ago. And I really, aggressively studied these areas and certainly, much more for everyone listening to this. So, I certainly didn’t come across. I’m wondering, is it just because it’s so new? I mean even yourself, 2005 to 2006.
RC: Correct. I’ll use another example – fish oils, Dr. Jorn Dyerberg, whom you have spoken to and you know him very well also, discovered fish oils back in the late 60s and early 70s. He realized, “Wow! These Eskimos have a great cardiac profile.” They have less heart attacks, less strokes by taking this fish oil, which you would think to increase cardiac disease. This was old and in fact in the 70s, so we’re going back 30 to 40 years ago. It’s taken that long for the whole community to really embrace fish oils as being an anti-inflammatory. We even have it now as a prescription. It took a long time to get to that.

It’s similar with astaxanthin. We have years and years of studies on animals – fantastic outcomes. Really, it’s only in the last seven years that we really started converting over now to human clinical trials. It’s really reflecting the same results that we saw on animals. It has tremendous benefits. It takes time to build up that reputation to get the word out and for clinical trials to be repeated. We like to see a clinical trial. We like to see a repetition of that clinical trial to confirm and ratify. Yes. It actually does do that. We’re arriving there.

It is a neophyte in the field of antioxidants, but I do believe and I call it the next fish oil. I really call it the next fish oil, because I think its potential is explosive. Thanks to you and your opinions on Dr. Oz, it’s getting more play time and people are realizing it.

That’s our job. That’s what you and I do. We teach. We educate. We want to improve the wellness. We are educators to help people have a healthful life, a long life, and a happy life. As we learn, we’re passing on the message. It is a new supplement, but it’s a rising star. It’s rising very quickly.

I used the fish oil to tell you how long sometimes it takes to penetrate the market. But it’s a star, it’s here to stay, and I call it the next fish oil.

DM: That’s a good analogy. One of the motivations for me to start the newsletter way back in the late 90s was a pretty much a mass of frustration in the current process with respect to educating the public. I have known about this since the mid to late 70s when I was in med school. It just seems surprising that it took so long for something that’s widely (and I didn’t know why I didn’t know) to be certainly recognized within the scientific community as being beneficial. That it took additional decades before it was commonly applied in the public.

I could do what I could in my practice, but it seemed like the educational intervention that I have integrated a lot of. I have seen a far better platform to speed up that process. Of course, you combine it with other media like television with Dr. Oz. You get exponential educational benefits. It’s really great.

But the key part of that equation though, is you have to understand or identify these areas, and that’s what where I’m really grateful for individuals like yourself, who have been able to read 400 to 500 studies. [Laughs] One of the challenges with information is so much more as exploding that it’s impossible to keep up for anyone or for any individual to keep up.

We rely to team of individuals who have these passions like yourself and can really educate us very deeply on these topics, that they have the time to read all these studies on it, because it’s basically a full-time job to do that. For those of us who don’t have that luxury and full-time opportunity to really investigate these issues, I’m wondering what resources you could
recommend for people, beyond this video and article that we’re putting together, so that they could learn about astaxanthin and the studies behind it.


**DM:** Can you spell that?


**DM:** Okay, perfect. Thank you for that. Because you know, people feel much more confident when they’re able to independently and objectively validate these claims or statements for themselves. That’s what we seek to do. Every time we write an article or mostly every time we seek to identify the original studies, so that if people don’t believe our perspective or our interpretation of it, they can go and analyze it themselves and make their own conclusions. That’s our intention.

One of the other approaches – and I think we’ll both agree are horribly implemented at this point – is the traditional and conventional model to treat or optimize cholesterol levels. *[Laughs]* I’m wondering if you could provide your perspective on that and how you would incorporate astaxanthin into that treatment plan.

**RC:** Yeah. It’s still the number one killer in our country. There are 1.2 million people who have heart disease, and over 400,000 people die every year from a heart attack. It’s still the number one, and it’s a problem. It’s got to do with our lifestyle. We live a very stressful lifestyle. We don’t eat well. We create inflammation. Our answer to it is we give a statin, a prescription pill, which may be necessary in some cases.

If someone comes up to me and says, “Hey, I have just been diagnosed with heart disease. My cholesterol is high.” my little recipe would be first of all take into account, what is the total cholesterol? If your total cholesterol is above 300, then maybe you do need to take a statin. Just to really get it down very quickly. The problem that I have is you really only be on statins for a short period of time. I say, 90 days, three months, to six months. That should be it.

During that 90 or 120 days, you now need to implement all the changes in your lifestyle. You need to begin an exercise program, stress reduction, whether it is laughter, meditation, or a hobby. You need to keep inflammation in check. You need to make dietary changes. You got to get off the high sugar and excessive carbohydrates. If you smoke, you should stop smoking. Not too much alcohol. I say in sensible, sensible amounts.

You don’t want to have too many animal fats, and I know you’re a fan of lean, red meat and so am I. But we have people who have bacon for breakfast. They’re having ham on their sandwiches. Then they have ribs. You have got to cut down the amount of animal fat and cheeses. You have to switch over carnivore to a vegetable-based diet, fruits…
DM: I think it’s important, too, to look at the quality. I mean obviously, you don’t want too much protein and fat if it’s a ham sandwich and you got processed meats, nitrates, and all those components. But if you’re having high-quality, properly prepared animal products, I think that they can probably be more beneficial than excessive processed foods.

RC: I agree with that. But in this society, we’re a society who eat on the run, eat on the go.

DM: Yeah, that’s not right.

RC: We’re travelling a lot. We’re in airports and hotels. It’s a problem. We need to keep that in mind. Go more for a plant-based diet, definitely exercise, stress reduction, keeping inflammation in check. We definitely want to include supplements that have cardioprotective effects. So number one, astaxanthin (pushes your HDL up 15 percent and reduces triglycerides) and ubiquinol, the cardioprotective effects of coQ10. We want to introduce omega-3s, so that we can reduce our inflammation around the cell…

RC: Reduce the [inaudible 1:10:00] of platelets, and definitely other supplements that are definitely going to help us. So, that would be my first profile, and I would definitely want to tell people that this is a program. This is not a prescription and you’re just going to take this every day and it fixes it. It’s a lifestyle adjustment, and if you want to live a long time and you don’t want a heart attack and produce a heart failure, you need to get off the statins once your cholesterol is down and implement these other changes.

One extra thing that I think is very, very important is that astaxanthin did not reduce LDL cholesterol, and we all know that the LDL cholesterol is the bad cholesterol. That’s the taxi cab that carries cholesterol, drops it off in the coronary arteries or in the coronas, and causes the buildup of plaque.

This LDL cholesterol is not reduced by astaxanthin. But more importantly – and I say this very empathically – LDL cholesterol is not a bad cholesterol in and of itself. It’s only when it becomes oxidized does it become bad. Because when it becomes oxidized, now the immune system, the white blood cells, will recognize that this oxidized LDL is not a good thing, and it will engulf it. It will have an inflammatory response. After the inflammatory response, we get the hardening portion called plaque. Then the plaque [inaudible 1:11:27] will narrow the artery and we get a blockage and thrombosis and a heart attack.

This is the key to astaxanthin. It stops the oxidation of LDL cholesterol, which I think is a critical thing. And it’s been studied in Finland and in studies out of Sweden, and it’s been in the general atherosclerosis that astaxanthin reduces the oxidation of LDL cholesterol. This is the LDL cholesterol that is responsible with the buildup of plaque in arteries.

I would definitely want to introduce astaxanthin as a part of my cardiac protection profile. And if you allow me to give this example: if you all remember back in 2004 when Vioxx, which is one of these NSAIDs… It was a Cox-1 inhibitor. It wasn’t supposed to upset your stomach or cause any bleeding problems. When Merck produced Vioxx, after a year or so, they found that there was an actual increase in the amount of sudden heart attacks and strokes, and they had to take it off the shelf.
There was a commission to study. The government said, “Listen. We want to know, is the Vioxx actually causing a pro-oxidative? Is it accelerating the atherosclerosis?” So, what they did is that the Harvard Commission said, “Okay. Well, if it is causing this pro-oxidative reaction with the LDL cholesterol, we need an antioxidant to oppose it.” And out of all the antioxidants on this globe – vitamin C, resveratrol, you name it, the acai berries – they chose one antioxidant, and they chose astaxanthin from the marine algae, H. pluvialis. They took this astaxanthin, gave it with the Vioxx, and they found that it blocked the oxidative effect.

Now, the Vioxx did not cause this bad side effect. It did not accelerate the atherosclerosis. And so when we look back, we say, “If only Merck would’ve known at that time, they would’ve marketed both together.” As you know this became a 400 billion dollar lawsuit.

But I think this speaks volumes. I think this speaks volumes on the power of the antioxidant ability of astaxanthin, that these researchers chose astaxanthin to stop the oxidative effects of this medication on the LDL cholesterol. So, another tremendous study to show its antioxidant abilities.

DM: I was not aware of that. It sounds like they should’ve had a product called AstaVioxx, which was combined astaxanthin and Vioxx.

RC: Maybe you and I should do that, and we can think about our next plan.

DM: But I would just like to update a few points on the Vioxx story, which I find fascinating. I didn’t realize astaxanthin prevented damage, but actually Merck was well aware of this before 2000, the year before that they took it off the market. Because I published the study on my site in 1999 before it was even legally used in the United States. The initial research showed that it would increase the risk of strokes and heart attacks, and I cautioned people not to even use it before it was even approved. And then they took it off five years later off the market.

So, they knew about it. The interesting component – it really is a classic example of what’s wrong with our system – is that even though they killed 60,000 people from releasing this and there were tens of billions of dollars of lawsuits, only late last year – I think December of 2011 – they finally settled the class action lawsuits for just about one billion dollars. They were able to manipulate the whole judicial and legal system and really circumvent retribution they deserve for at least providing financial benefits for people they killed, which is kind of tragic.

RC: You’re actually correct, and we’re really seeing a mirror effect with the statins. You and I both know and have spoken about some of the untoward shortcomings of statins, especially if they’re used for a long time. We’re talking not just muscle aches and the elevated liver enzymes, but cognitive decline and the increase incidents of diabetes and heart failure once you’ve been on these drugs for a long time.

These drugs are meant for short periods, and that’s it. They’re not meant to be chronic medications. Unfortunately, our medical community – our brothers and sisters in arms out there – are being brainwashed to think that you just give a statin, and that’s it. For the rest of your life, your cholesterol’s under control, but there are side effects.

DM: They are. Thankfully, just recently at the last week or two, the FDA approved the inclusion of those side effects to be on the labeling now. That, at least, is beneficial. Of course, no one will
virtually know if the physicians will mention those to the patients. A mutual friend of ours, Suzy Cohen, is the one responsible for helping me identify the connection to diabetes and the increasing risk of it. That’s actually in the warning label now, too.

Now, I just want to really thank you for bringing up the point of how astaxanthin can be useful in a cholesterol optimization program with reducing the oxidation of LDL. That’s a really important point. I want to emphasize it, because most people don’t understand that if cholesterol does cause damage and it does, I believe there’s significance because there’s this whole counterpoint that cholesterol is used when you don’t want to lower it. But damaged oxidized cholesterol does cause a problem, and it needs to be reduced. The way to do that is if something like astaxanthin…

The challenge for that and the reason why this isn’t commonly recommended (at least from my perspective) is that there is no laboratory test for oxidized cholesterol. There’s no commercial essay for it that you could go to your doctor and have it done and know that you’re getting benefit from taking astaxanthin. You almost have to do it theoretically from this perspective.

But I didn’t have a deep appreciation until you mentioned it and I want to thank you for that, because now it’s absolutely going to be a part of my recommendation when anyone discusses it or when discussed in the site, including astaxanthin, because I didn’t really appreciate that it protect the oxidation of LDL so effectively.

RC: That really is the key. That is the first domino that falls. Cholesterol, as you’ve just said, is useful for our body. Our body uses cholesterol to make the covering of nerves, so that we may have good nervous transmissions. It makes hormones. It makes our steroids in our body. It makes bile cells. Cholesterol is absolutely vital for the body.

However, when it gets elevated and it’s carried around by this taxi called LDL cholesterol – the most abundant form of cholesterol in our blood is LDL cholesterol – it is fine, unless it becomes oxidized. That is the tipping point. Once it becomes oxidized, now it’s recognized as something foreign, dangerous. We get a conglomeration of the white blood cells. We get what we call foam cells, inflammation, and then the whole process towards plaque formation, clots, thrombosis, and then we get a heart attack or a stroke.

This is the key point. The oxidation of LDL cholesterol to be prevented is actually vital for our cardiac and cerebral health.

DM: And just another sort of finetuning detail on the treatment program is the numbers involved. You mentioned the value of 300. From my studies, there’s this condition called familial hypercholesterolema, a genetic defect on the LDL cholesterol receptors.

Typically in my clinical experience, the level is about 330 or 340, at least from what I’ve seen. It is very unusual to see that disease didn’t have below that. These individuals, they’re very rare. They’re about one in 10,000 people. So, I saw about 30,000 patients before I stopped practicing five years ago, and I always had three patients with this.

One in 10,000 is a pretty low risk. You could almost guarantee that you don’t get it, unless your cholesterol is going to be that high that you may want a genetic test. If these individuals had a clue that astaxanthin is going to be useful, there may be, you mentioned, a short-term treatment
for a few months. But you know, this genetic challenge, it may be a benefit for them to continue it at least in a low dose for longer terms to prevent that damage.

**RC:** In these unfortunate individuals that you’ve just described with familial hypercholesterolemia, who really, generally went into the 400s and they have a family history.

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**RC:** They’ll develop xanthomas around the eyes and other manifestations. This is a genetic problem, and they probably will need to stay on statins for a lifetime at very low doses. Having said that, I get letters from people who have this condition, and I definitely recommend astaxanthin so as to protect against the oxidation of the LDL cholesterol.

So, they’re on the statin to reduce the overall number, and I’m giving them the astaxanthin to stop this oxidation, which for me is the key turning point, because this is now the process down towards atherosclerosis, plaque, heart attacks, and strokes.

I’d definitely include that. I’d definitely include omega-3s also, which is almost a little bit an anti-inflammatory. But statins in this situation, you’re correct. Until we come up with a better medication to control it, they will require it. The body makes anywhere from 350 to 700 milligrams of cholesterol every day. We make that. With the people with familial hypercholesterolemia, they’re making an excess of a thousand milligrams – 1500 milligrams – every single day. It accumulates and then it becomes oxidized. And that’s the key point.

**DM:** Okay. You’ve made it clear that it’s useful and would recommend to take astaxanthin if you happen to be taking statin for any reason. But I’m wondering if you can comment on the safety of astaxanthin with other cardiac medications, such as drugs that people take for heart failure or anti-arrhythmics, even for that matter, any other medications. Are there any interactions with pharmaceutical medications?

**RC:** That’s a great question. We have given astaxanthin to people on blood pressure medications, all types, the ACE inhibitors, the beta blockers, the alpha beta vaso-dilators, people who need inotropes, digoxins, corgones, the increase of pumping action, even people who have taken blood thinners. We’ve not seen any adverse reaction. In fact, we think it is quite synergistic and complementary to the medications and the blood pressure medicines also.

As we’ve been talking, the reduction of LDL cholesterol oxidation. We really don’t have any drugs that actually do that, so astaxanthin is actually doing something that the pharmaceutical drugs are not doing. And as we pointed out, this is the critical domino that falls. But in answer to your question, we’ve had no adverse effects in combination of other medications.

As always, we always have to tell people, “Please check with your physician before you begin any new regimen with a new medication, a supplement, or a vitamin. Please check with your physician.”

**DM:** Okay. Thank you for that expansion. I just wanted to have one comment, too, on the use of astaxanthin in rheumatoid arthritis, because it’s an area that I had particular clinical interest in. In the late 80s, I started a protocol developed by Dr. Thomas McPherson-Brown out of Virginia, who had treated over 10,000 patients of rheumatoid. Over the following 20 years, I wound up
treating about 3,000 patients. It’s quite an extensive experience, certainly more than a traditional family physician. And with the models, I eventually significantly modified his protocol, and he passed away in the late 80s.

About 75 to 80 percent of the people are getting improvement. The reason I mentioned that I’m really kind of disappointed that I wasn’t aware of it this time, because I never had the opportunity to apply astaxanthin in that model. It would’ve been fascinating to see how that supplement would’ve worked, because, in my viewpoint, I’ve great respect for. I don’t appreciate the fact that so many of my regents have this professional arrogance and exploit other alternatives. But there are very few specialties or sub-specialties, where I feel that there’s almost not a need for them. But one of them is rheumatologists.

The reason why, not that they weren’t great individual human beings as rheumatologists, but the model that they are using, there’s not one thing they’re doing other than maybe directing towards some type of physical therapy for individuals that’s helping them. With respect to addressing the long-term cause, every single drug they use is as toxic as can be.

When I would treat a patient with rheumatoid arthritis, the primary first step that we had is get them off their drugs. Sometimes, we couldn’t do that, and they had to stay on low doses of steroids or methotrexate, but we had to wean them off for months or years. But eventually we were able to get most of them off. That’s the first step we had: to get them off of those drugs. But they had to stay on them because they’d be crippled or they might commit suicide. The pain was so bad.

As I’ve mentioned earlier, the worst patients I’ve ever seen – fortunately there’s not too many. The patients were [inaudible 1:25:00-01], which is kind of like rheumatoid arthritis and steroids. They get the joint deformities and the pain, plus they have this rigidity in their skin and their structure. It really is one of the worst clinical conditions I’ve had the opportunity to treat.

RC: It is devastating, and you’re right. I think physicians are overwhelmed. We now know that in medical education, the medical information doubles every four years – three to four years. By the time you finish a classic medical education in med school of four years, by the time you get to your fourth year, half the stuff you learned is obsolete, and there’s a whole slew of new of information.

Conventional medicine physicians are really stretched. They’re overwhelmed. They can’t keep up with all the latest developments. That’s why we see these niches, these specializations, because there’s just so much information in each specialization. You can’t really expand and broaden your horizons. You and I are very fortunate that we can continue to study and read now that we’re out of the office practice and more on education. We’re teaching physicians, and we’re teaching the general public.

I’d like to say something positive. I think the medical schools are now beginning to agree and understand that preventive medicine plays a big role. So, we’re now seeing an expansion of nutrition in the medical education. They are now at least open-minded and introducing integrative and functional medicine into their programs.

This new genre, this new generation of physicians that are coming out, I think they are going to embrace natural medicine and the stuff that you and I are talking about a lot better than our set
physicians who are already trained. And we are also seeing now a little bit of a change in the pattern: that the actual patients are bringing the information to the physicians, that the physicians are forced to understand that probiotics actually help the gastrointestinal tract and the immune system. They now understand that omega-3 oils are anti-inflammatory, improve neurological transmission of messages, and are also involved in the healing process.

So, they are beginning to understand. I’m seeing in hospitals that physicians are even prescribing vitamin D3, because there’s such a slew and such a great exposition of information coming out in the media that the public are now taking to their physicians. I think there’s a paradigm shift. I really do. Thanks to you, Oz, and the group of us who are really helping this move. There is a paradigm shift. I have optimism for the new…

DM: Well, you do. And I think it’s important to be optimistic, because we’re up against some powerful forces, and many people may not fully appreciate like the majority of our listeners are in the United States. It’s been nearly 20 years now since the very powerful political lobbying and political collusion between the drug companies and the government allowed the United States to offer it to be legal to advertise pharmaceutical drugs and television. It’s one of only two countries in the whole world where this is legal! I mean it’s just shocking and mind-boggling.

But if you have been exposed to it for 20 years, you think it’s normal. It’s not normal. It’s illegal. It should’ve never been allowed, and we need to have this balance to counteract that type of constant barrage of subtle misinformation that really encourages people to ask their doctor not about probiotics, but about the drugs for the treatment for whatever condition and problem that they’re trying to promote. It’s just shocking that it’s legal.

RC: I agree, and I think that the general public is now starting to be a force in bringing this to light and really present them to their physicians, saying, “I want a different way and I don’t want to be taking toxic drugs all my life. There needs to be a better way.”

At the same time, we as individuals, we need to be become proactive and we need to have an impact in our own healthcare. Once again, we’re putting biological currency into our biological retirement account for later on. And we need to do that now. It’s not late when you say, “Now, I want to lose weight. I want to stop the diabetes. I’m going to get off these drugs.” You have to do it preemptively.

That’s what we’re hoping our audience is paying attention to and hopefully we could convince them and give them the tools to begin that, to draw that new landscape of a healthy life. Good health and wellness equates to happiness. I don’t see a lot of very ill people who are happy. Most people who are very sick, they wake up and they know they’ve got to take their medications, and the foremost thing on their minds is, “how is the day going to be?”

[---1:30:00---]

RC: “How is the pain going to be? How is my breathing going to be today?” It’s always connected to their illness. Wouldn’t it be just great to wake up and say, “What a wonderful day! I feel great!” This is what you and I are trying to transmit to the audience that it makes a huge difference. Experience it, and let us help you.
DM: I couldn’t agree more. It’s important to have the details correct also, because you could have a superficial understanding. But the implementation, if you don’t have the specific details, it can be fatally flawed.

One point I wanted to mention on my tangent on the rheumatoid arthritis treatment – and the point I brought it up is not just to be on a soapbox, but to ask… I regretted not having the opportunity to clinically experience the benefit of that. And I would’ve had the opportunity in some very severely, highly inflammatory individuals to have personal experience in feedback, because it’s just a wonderful model to interact with.

But on the dosages, I think you mentioned earlier about six milligrams, but it would seem when you have these highly inflammatory conditions that a higher dose might be beneficial – I mean upwards to 12 or even 20 milligrams. And I’m wondering from the literature that you’ve reviewed if there’s any sort of therapeutic windows that one might shoot for in these sort of exceptional inflammatory conditions.

RC: Intuitively, you would think that. But we’ve found and researched the higher the doses, what happens is we plot it out and it becomes almost the diminishing returns – the more we give, the less benefit we get. And this happens with various supplements and various medications. I have not seen studies on greater than 10 milligrams a day with rheumatoid. And even between four and six, they’ve got a great result. If they’ve got other inflammatory conditions, like you’re talking about scleroderma (which I have not seen a specific study with scleroderma and astaxanthin), I would say six to eight.

But what happens is we do get this scale of diminishing returns the higher we go. So, what I’m discussing to you today is based on actual clinical trials and different doses for different conditions. When we talk about the LDL cholesterol, it’s a [inaudible 1:32:30] chemical, and 12 milligrams seem to be the most efficacious amount. When we went to 18 milligrams, we didn’t get any improvement over the protection from oxidation.

When we give six milligrams and eight milligrams in skin, we didn’t get any improvements of protection from sunburn or the aging effects. And with the arthritis, this seemed to be the dose. Between four and eight milligrams seemed to be the dose that was most efficacious. This was the label that really inhibited the nuclear factor kappa beta, tumor necrosis factor, the interleukins, the cyclooxygenase pathway. It was that dose.

These are things that are still evolving. We’re still finding out and as you were just saying, you wished you knew about it. That’s the evolution of medicine. That’s the evolution of health.

Another thing I think should be mentioned would be curcumin, a tremendous anti-inflammatory. I know it’s one of your favorites; it’s definitely one of my favorites. And we weren’t using curcumin back 10 years ago for inflammatory disease, although it was taken in the natural form as a curry and a spice in Asian and the Eastern Indian countries. But now we use it as a supplement because we know it has such powerful and health benefits. As we go forward, we’re going to discover more. That’s how medicine and health evolves. We discover, we understand what can prevent and we know what we can give as treatment, and we’ve made a lot of progress in the last 10, 15 years.
DM: The curcumin’s particularly fascinating. I was on Dr. Oz’s show a few weeks ago, and we had this little segment where we rated the spices and he allowed me the opportunity to rate them. And I actually rated turmeric as the number one spice not so much for the anti-inflammatory component, but for the anti-cancer. From the research we reviewed, it doesn’t seem like there’s one cancer that it doesn’t work for. So, it’s really one of the only natural products that seems to be almost universally beneficial for cancers.

But the challenge with it is it has to be absorbed. Solubility is a really big issue with it, so there are very, very few products of curcumin that are currently in the market where it’s clinically useful. We’ve been actually in trials. This is really the only clinical trial we’ve funded to come up with an alternative product. We’ve been in it for two or three years now and hope to have something in the not-too-distant future. But that’s the big challenge with curcumin.

RC: It is a big challenge. In fact, when you’re talking about its effectiveness in cancer and some of the great results, these were at tremendous doses of 12 grams [inaudible 1:35:02]. That’s quite heavy. There are some studies showing that if you include it with piperine, there’s increased bioavailability. And there is a product called BCM-95, which was developed in, I believe, MD Anderson, and it has great bioavailability – greater than what’s out there on the field. And this is just for your edification.

Terry Lemerond, I believe, has the best curcumin in the marketplace right now. It’s BCM-95. And what he’s been able to do is isolate… You know there’s multiple curcuminoids, and he’s isolated the most potent, the ones that are most active curcuminoids out of the whole slew and team of curcuminoids. He’s isolated it, and he’s been able to mix it with actually turmeric oil and some [inaudible 1:36:00] to help as a transporter. And they’ve done some great studies to show great bioavailability. Maybe at some point…

DM: Sure. We’ll definitely look into that. We’ve actually been working with a number of investigators to implement some other pretty effective strategies.

Getting back to astaxanthin, it has an absorption issue, too. Not as bad as curcumin or as much of a challenge, but it is a fat-soluble. I don’t think we’ve mentioned that previously. We certainly know that. But many people listening may not have that appreciation. It’s very similar to vitamin E. And it’s such a small dose. We’re talking a few milligrams, which is a really tiny amount. You can have a dramatic difference in the amount you’re physically getting into your system, unless you’re paying attention to the details and take it with fat.

I wonder if you can comment on that, and also on a toxicity issue or a concern, because the most susceptible individuals in the human race are the children and pregnant women.

RC: Yes.

DM: Are there any special concerns about that, especially in light of the fact that I think some people would think or believe or sort of have this impression that there might be some potential toxicity because it’s in the carotenoid family. And there’s, of course, the concern about large doses of vitamin A in pregnancy.

I don’t think there are any issues, but I’m absolutely confident that you may eloquently expand on those comments.
RC: I’ll answer for the first part, for the absorbability. It is a fat-soluble nutrient and therefore, it would require fats. It would need other fats to be absorbed more efficaciously. We’d really like you to take astaxanthin with food – carbohydrates or even with some kind of fat food. What that does is stimulate the gastric enzymes, your digestive enzymes, bile cells, which help to absorb the astaxanthin. We want it to go on with food rather than just on an empty stomach, because then you’re not producing sufficient amount of enzymes to cause this absorption through the intestinal walls. That’s the first part. With oily foods or fatty foods, it would be the greatest effect.

With regards to safety profiles, as I’ve said it has an excellent tolerability of safety profiles. When we’re talking about children and talking about pregnant women, as in all medications and in all supplements, we have to be very, very careful, because we’ve got a developing fetus with a very porous blood-brain barrier. It’s still developing.

We do not recommend it for pregnant women not because we think it does any harm. Just like any medications, you don’t want to experiment with young children and pregnant women just to see if your medication works. It’s just unwarranted, unethical, and that would solicit unwarranted mitigation. We do not have long-term studies on pregnant females.

Having said that, there have been studies on pregnant animals, specifically rats, where they gave 2000 milligrams per kilogram and found that there were no maternal effects. There were no bad effects to the fetus. There were no developmental effects, no embryological effects. Everything was absolutely perfect. That’s in an animal model, but they did it just to say, “Hey, should we be aware of things?” But once again, I would state that we are not recommending it for pregnant females.

With regards to children, the same thing. Children are still developing. They do not have fully developed kidneys until they’re seven or eight years of age. So, we don’t recommend astaxanthin for children under 10. Just for those late developers, just to make sure that their kidneys are fully developed. Having said that, my children were taking it when they were eight, and we actually have no harmful effects.

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RC: But once again, in those pediatric and maternal populations, we’re very, very careful. No matter what we prescribe, we are very, very careful until there are long-term studies to prove it. We’ve only in the last five years recommended omega-3s, because we’ve done long-term studies with the omega-3s on pregnant females to show that it does help in brain developments of the fetus and prevent some problems.

Once again, we’re going to keep it very simple and very safe. We’re not going to enter into an area that we’re unsure of until we get the long-term studies. Pediatrics and pregnant women, we’re not recommending it. Not that we think it’s toxic; we’re pretty confident it isn’t. It’s just that’s the standard of the industry, and we’re following that standard.

DM: Absolutely. But personally and professionally (you more than me because you’ve read the literature), it sounds like that you would be more comfortable and confident in it if your wife is pregnant that she would be taking it and probably not at a higher dose, or your kids. But you cannot professionally recommend it, because there’s just no long-term data for that.
RC: Correct.

DM: Okay. Thank you for that expansion. Now again, continuing on the importance of the devil’s in the details. We know about the toxicity. But if one is convinced as I am – it would be difficult to mention that they wouldn’t be from listening to this conversation – that they want to consider taking it themselves. How do they identify the best source of astaxanthin? Because there are a number of different sources out there, how can they make sure they’re getting highest quality possible?

RC: The devil’s in the details. Whatever you take, whatever supplement you take, the source is so important. We want a natural source. We want to make sure that it has no pesticides, no contaminants, no heavy metals. The source is very, very important.

Before we discussed that there’s different ways of attaining astaxanthin in salmon and krill and shrimp, I think the best source, in fact, I know the best source is the marine microalgae H. pluvialis. It’s a marine source. And the source we should be looking for is something that is grown in a very controlled environment, does not use pesticides or herbicides, and has a very low heavy metal or contaminant profile. That is the best source.

I also want to point out that most, if not all the studies of human benefits of astaxanthin, are all based on the astaxanthin attained from the H.pluvialis, from the microalgae. I haven’t seen any studies from the krill, from the shrimp, or the salmon. Per se saying that this astaxanthin came from salmon and this was the result due to the astaxanthin. When we look at all these studies and all these benefits that we’re discussing today, the source was astaxanthin from the marine algae.

Now even though it is the same molecule, astaxanthin is C₄₀H₅₂O₄ – that’s the molecular formula. The astaxanthin in each of these different creatures is actually folded differently, and the astaxanthin that comes from the microalgae is in its original form and we call it a 3-S, 3-S prime. Once it’s taken into the food chain, it’s actually adjusted a little bit, and the molecular profile changes. For example in krill, it’s 3-R, 3-primeR and a little bit of 3-S, 3-primeS. All these fancy numbers, but each time it shows that something is being changed a little bit, even though it’s the same astaxanthin.

When people ask me, “Which is the best? This astaxanthin’s from krill. This astaxanthin’s from microalgae, and this one’s from fungi.” I immediately say, “Astaxanthin from microalgae.” “Well, it’s the same astaxanthin,” people say. And I say, “Yes.” And I’ll give you the metaphor that I explain to everybody.

Three children come to me and I say to them, “There’s a piece of paper. It’s the same piece of paper. It’s made exactly the same. It’s the same shape. And I want you to fold it and make me a paper airplane.” Each child folds his piece of paper into the best paper airplane and they throw it. I’ll take you to the example of the salmon. The kid folds it, he throws it, it falls, it drops. The second child folded his piece of paper, it goes a little bit further, and then it drops.

The way the folding of the astaxanthin in the microalgae, it flies further, faster, and longer. The same piece of paper, but it was the way it was folded that gave it the power to go further, faster, and longer. And this is the metaphor I use when I’m talking about the different sources of astaxanthin.
The molecular profile is different in the microalgae. It’s folded differently and gives it more potency, more capacity, and that’s another reason why I choose the astaxanthin from the microalgae. I hope that clarifies when we’re talking about the different sources of astaxanthin. But it actually does make a difference, and the microalgae source is where all the studies that we’re talking about today are based upon. It is the microalgae astaxanthin, 40,000 parts per million, gram per gram, the original folded profile, and I think that really explains why I choose the microalgae H. pluvialis.

DM: Thank you for that eloquent explanation. The question I have was with the astaxanthin content and krill. Because you mentioned earlier the parts per million concentration, but I’m wondering if you can translate it to a milligram, and specifically for the naturally occurring astaxanthin, which as you’ve mentioned is a slightly inferior version than the one that’s from the microalgae. In my understanding also is that most raw material suppliers of krill (and there’s not many; there’s literally half a dozen, and there’s a handful across the whole world that actually harvests this) actually use additional astaxanthin to increase the concentration within the krill.

RC: Well, I think you’ve just nailed it. We start off with the microalgae, the crustaceans shrimp and the krill, and the salmon, all come down this food chain to get the original source of the astaxanthin from the microalgae, and they change it as it goes up the food chain.

Kril does contain astaxanthin. It needs to be supplemented, and I’m not sure what source they use, whether they’re using the synthetic type, which is made of petrochemicals, or they’re supplementing with microalgae as source of astaxanthin. I think the real excitement about krill oil is that it contains astaxanthin. It’s folded a little differently, but it’s combination with the phospholipid omega-3. That’s really the golden key to krill oil. It’s a combination. It’s synergistic. They interface perfectly. They’re complementary in the body. That’s where the krill oil has really got a lot of its success, because you now have this double-fisted bing-bang, and they’re really effective. It’s a great combination.

If you’re talking about just purely astaxanthin and the things we’ve been talking about today in reducing inflammation, in cardiac protection, cognitive and neural protection, and immune stimulation, the pure astaxanthin is in the form of the microalgae. It’s more concentrated. It doesn’t need supplementation. It doesn’t need any addition to it. I think it does work synergistically with other supplements. Omega-3 has been used and with vitamin E.

But I hope this clarifies a little bit that there are different sources—each one has their own benefits. We’re not stomping on either one of them. We talked about vitamin C today, and we really haven’t plugged vitamin C, but it is an absolute necessity for life. We all need vitamin C. We do not make vitamin C, so we need to take it in. Without vitamin C, we wouldn’t be able to live. We’d all have collagen-vascular diseases. We’d have—that’s what the British call the line of dermatological issues.

So, we’re not trying to push any single one, but when we’re talking about sources of astaxanthin, there is one pure source and it’s the microalgae. It’s the one that’s the most potent. It’s proved itself. Studies show it. They continue to roll out with more and more studies of astaxanthin from the microalgae.
I do believe that it will be combined with other formulas. I’ve already combined it with CoQ10. I’ve combined it with omega-3 in the past. They’ve been very synergistic and worked. And we’ve already discussed in combination what lutein and zeaxanthin. But I want to emphasize it was the microalgae from the H. pluvialis, and the results show that way.

**DM:** Let’s talk about its combination with the omega-3 fats. One of the reasons why I’ve been such a strong advocate of krill over fish oil is because of the astaxanthin. For two reasons: one is it’s a source that will provide some benefit that we’ve been mentioning over the last part of the discussion independently. But it will also provide benefit to the actual omega-3 fat, because one of the biggest dangers of this fat is that it has many double bonds and it is highly susceptible to oxidation and developing peroxides.

The question is: does the intrinsically-occurring astaxanthin – the natural-occurring one produced by the krill, and there’s none in fish oil…

[---1:50:00---]

**DM:** There’s no astaxanthin in fish oil. Does that protect better than adding the astaxanthin into the product? I guess that it might be dependent because when you add it not conversely but along the same lines. Would that benefit be also extended to fish oil if you added the astaxanthin?

**RC:** It’s a complicated question. Krill oil is natural oil with astaxanthin combined already, so you’ve already got a natural process where they’re already combined. If we now separate them and bring astaxanthin and put an omega-3 oil, it’s got a different profile. It’s going to have a different dynamic.

The particular omega-3 in the krill oil, as you know, is a phospholipid. It’s bioavailable. It’s in its functional form in the body. We’re taking in a product that is ready made to be used. It’s ready. It does not need any adjustment.

Does the astaxanthin protect the fish oil and the krill? We don’t know. There are [inaudible 1:51:16] need to be done. Does it stop the phospholipid omega-3 in the krill oil from becoming rancid? Maybe the astaxanthin is protecting the omega-3 oil to do its job better. So, these are questions that research needs to go down the line with the krill oil.

In my situation where I have taken the H.pluvialis, the microalgae astaxanthin and combined it with a fish oil or an omega-3 oil, I also do not know the answers. I’m sure the astaxanthin is going to protect the omega-3 from becoming rancid. But at the same time, when I’m taking about 40 parts per million (the greater potency, the greater amount), yes, sure, it will shield some of the omega oil. But there’s going to be an extra astaxanthin to do its own work independently without protecting the omega-3.

And these are studies that we’re working out still now to see these profiles, how they interface, how they complement, and which one is most powerful player within the group. We’re still working on them. This is still a new ingredient, as you’ve mentioned, how these all fit together, and these things unfolding all the time. You bring up a great point.

**DM:** Okay. The answer is we just don’t know at this point, but it’s something that we will pay attention to certainly for future studies that address this, which is exciting.
You’ve talked a lot about dosage, which is kind of finishing up on the specifics and the details. Some with the specific conditions, they could listen to the interview again and find that out. But I’m wondering if you could just summarize and recommend your general guidelines for dosaging on astaxanthin.

**RC:** With astaxanthin, I’ll start off with a lower dose. If we’re taking it for an anti-aging effect for skin benefits, two to four milligrams, in that range, would be sufficient. If we’re talking about cardiac protection and neural protection of the brain, we really want to follow what the research showed, which is 12 milligrams a day. If we’re talking about exercise and endurance, I would be going for eight milligrams a day because that’s what the studies have shown. The cyclists that showed improved time trial performance, they were all taking six milligrams a day.

The famous study that came out of Sweden show that students were able to do more knee-bends, squats after taking astaxanthin, that was four milligrams a day. I think four to six milligrams a day for endurance and recovery. Let me see, what else could we talk about? For joint, we’ve said between four and eight milligrams.

As we’ve gone through these two, four, six, 12 milligrams, maybe people who have severe, severe inflammatory issues, who are on the chemotherapy, and are just getting bombarded with free radicals from toxic chemicals to eradicated cancer or to mitigate the effects, I would be looking at 16 milligrams, because you really need some antioxidant protection. And so, that’s when I’ll be talking about 16 milligrams.

That’s about my range, Joe. I don’t have the research that supports it, which is ongoing right now. Maybe next year, just like what we did with vitamin D a year ago, I might be saying on your next report, “Hey. We’re up to 20 milligrams in research for this particular medical condition.” Two, four, four to six, six to 12…

**DM:** That’s a good summary. Just one little quick question. We discussed it earlier, but I don’t recall getting specific answer and I know there is no answer definitively. But at least from your understanding of the kinetics, what would be the best time and what amount would you take if you’re under the use as to prevent against a free radical damage from flying in airplanes?

**RC:** Flying in airplanes – there’s a couple of things to that question. One, you want to be taking it with food. If you’re getting on a plane early in the morning and having breakfast, take it with your breakfast, so it’s on board right away. If you don’t have that ability to have breakfast, you might take eight milligrams the night before with dinner. It does have a good half-life between 15 and 24 hours, so it’s in your system. That’s with regarding to flights.

If I was going to go out and play golf or sailing or I know I’m going to be exposed to excessive sunlight for more than an hour or I work outside and expose to sunlight all day, I’d be definitely taking it with breakfast a couple of hours before I’m actually exposed, so it’s in my system. It gets the chance to get where it needs to be in the skin, once again, with food. Just general antioxidant coverage, with breakfast.

Whichever is the fattiest content food, you might want to coincide it with that, because then you’ll really take advantage of this bio-absorption.
**DM:** I couldn’t agree more. I personally take mine with breakfast, because I have two tablespoons of butter and four egg yolks, so that’s more than enough fat to get it in there effectively.

**RC:** You’ve got great bioavailability.

**DM:** Absolutely so. We’ve covered a broad range of topics and I think we’re pretty much approaching the end of it, but I’m wondering if you have any comments or items or words you’d like to say about anything we may not have covered or emphasize anything you want to.

**RC:** I think some of the points that you brought up… We have to take care of ourselves with the political milieu. We don’t know how medical care is going to be later on. As we all age, is it going to be abundant? Are we going to be restrictive? Are there going to be obstructions to access? It really is [inaudible 1:57:00] upon every individual to put some currency in your biological retirement program. Prevention, prevention, prevention. Lifestyle choices. It is a choice.

Nike says, “Just do it.” That’s why I say “Just do it.” A little bit of exercise. Make change in habits of your nutrition and food. Reduce stress. Reduce inflammation. Utilize some of the antioxidants that we’ve talked about today. We’ve definitely highlighted astaxanthin, which I think is the most powerful antioxidant that I’ve come across. Right now, I really want everyone to learn more about it and say, “Experience it for yourself.” I’m sure people are going to be excited and they’re going to feel the difference.

**DM:** Terrific. Now, if people want to find more of your wisdom, you website again is Robert Corish MD. Can you spell that?

**RC:** RobertCorish.com. They can go to the Nutrex-Hawaii, which is the [inaudible 1:58:04] astaxanthin site, a brand. AstaSupreme.com is another site, where you’ll find out more about astaxanthin. And I know your site has great articles on astaxanthin.

**DM:** Terrific. All right. I can’t thank you enough for all your amazing information and your ability to eloquently expand on this really important topic. I’m sure it’s benefited just about everyone who’s listened to it. And for those who did listen, I extend my appreciation for taking the time, effort, and energy to acquire this knowledge and share it with us.

**RC:** My pleasure.