Interview with Robert J. Ostfeld, MD, MSc

(INTERVIEW HIGHLIGHTS ABOVE; SCROLL DOWN FOR EXTENDED INTERVIEW AND TRANSCRIPT)

Robert J. Ostfeld, MD, MSc is a cardiologist and the founder and director of the Cardiac Wellness Program at Montefiore Medical Center in New York City, where he recommends a plant-based vegan diet to his patients. He earned his MD from Yale and his masters of science in epidemiology at Harvard. He is also an associate professor of clinical medicine at the Albert Einstein College of Medicine. Our co-founder, Sofia Pineda Ochoa, MD interviewed him on March 20, 2016 in New York City.

A short excerpt of the interview is above at the top of this post, and the extended version (about 58 minutes) can be viewed below.

- Interview Transcript

DR. PINEDA OCHOA: Dr. Ostfeld, thank you so much for making time to meet with us today. We really appreciate it. And first, can you please tell us about your background and your training?

DR. OSTFELD: Sure. Well, thank you so much for having me. It's a real honor to be here. And it's amazing the work that you guys are doing. So thank you so much for that.

So I've been interested in health and prevention for a long time. It's a little sad. When I was a kid, I had a couple of brothers, two brothers, die from an incurable disease.

My brother Daniel died when he was three. I was seven. And I

remember his funeral. And I wanted to throw stamps into his grave so he could write us, but I was too shy. I didn't do it. And my brother Michael lived for one day.

So since then, I've been interested in health. And one thing led to another. I went to medical school. And so I went to medical school in New Haven, at Yale. And that was just a great experience. And then I went up to Boston to do further training. And so I did my medical residency at Massachusetts General Hospital, and my cardiology fellowship at Brigham and Women's Hospital.

And I was fortunate to be able to get a master's of science in epidemiology during my fellowship at the Harvard School of Public Health. So it was really just an incredible time, an incredible experience. And I had the opportunity to work with just many brilliant physicians and scientists and teachers. And basically, fill in the blank. It was really just a wonderful group of people.

And so I learned a lot. But one thing I didn't learn about during my training years was a plant-based diet. And so after my training, I came down here to Montefiore to work as a cardiologist. And I feel really lucky to work at Montefiore. It's a big hospital system based primarily in the Bronx. So they have hospitals in Westchester, New York, as well.

And they have an incredible social mission that they take very seriously, really trying to promote health, prevention. Taking care of a population in need of help. So it feels wonderful to be a part of that.

And so when I started, I did all the things that I was trained to do. Guideline-based medications, which can be very helpful. Procedures which, at times, can be very helpful. And then maybe a Mediterranean style diet. And you know, patients got a little bit better, but not a heck of a lot better.

And after a while, I was kind of getting disillusioned, like

what am I doing? I didn't go into medicine to help people get just a little bit better. I really wanted to find a way for a transformational change. And so it was right around that time that a friend of mine, she handed me the book The China Study. The incredible book by Doctors Campbell.

And so I read that book and I was like, wow. Just made a lot of sense. So I learned more and more about it. I had the chance to meet a lot of luminaries, many of which you've interviewed for this program. And I was really taken by it.

And so one thing led to another and started our Cardiac Wellness Program at Montefiore with the goal of preventing and reversing disease with a plant-based diet. And I say disease, not just heart disease – I'm a cardiologist – but I say disease because sure, eating this way, yeah, it's great for your heart. But it's good for you for dozens and dozens of other reasons.

And so I've been cardiologist now for about 13 years. And outside of emergency surgery, like someone gets shot and they have to be put back together again, so outside of an extreme example like that, I've never seen anything come close to the breadth and depth of benefits that a plant-based diet provides.

I mean, we literally have patients crying tears of joy in our office. They feel so much better. It's just amazing. So our program has been around for about four years. And we're really lucky. We get to teach residents, fellows, medical students. We get to speak about it and help to, hopefully, inform other docs, providers, about the plant-based diet. And so it's really been just an incredibly gratifying, satisfying, and exciting experience.

DR. PINEDA OCHOA: That is so amazing. And with all the training that you have, it looks like something so simple. So you have trained – well, you went to medical school. You did

internal medicine. You did cardiology. And wait – you said those hospitals are like, I think, affiliated even with Harvard, right?

DR. OSTFELD: Yes.

DR. PINEDA OCHOA: You went to Yale. You've got Ivy League sprinkled all over you. You've got all of this fantastic training. And you are focusing on something that people might say, or dismiss as: "It's only nutrition." "It's only food." Why is it so important? Why do you pay so much attention to educating people on nutrition with your field, with the cardiology field?

And also, what is wrong with eating dairy, fish, eggs, and meat. If it's organic, if it's farm raised, what is wrong with eating those foods?

DR. OSTFELD: Yeah, those are great questions. And I've come to learn that how you eat and how you live is truly the foundation of health. And there's a great analogy that I've heard that you can look at a kind of medical care – if you can make a clogged sink analogy, where you turn water on in the sink. And if you stop up the drain, the water will go up and go up. And eventually, it will spill over.

And one of the things we do in medicine now is we're really good at mopping up the spilling water. But we're not really getting to the underlying core of the issues. And in many cases, perhaps even most cases, it's lifestyle – how you're eating. And so instead of mopping up the floor, if we just change the lifestyle, unclog the drain, that would take care of the underlying root of the problem.

So I look at that analogy as kind of why the underpinning – or helping us with understanding why the underpinnings of health truly is lifestyle. A healthier diet, exercise. So in regard to, say, why is it that a plant-based diet, per se, may be the optimal way to unclog that drain, there's a lot of different

types of evidence to support that. From very, very large population studies of hundreds of thousands of people, looking at – and we'll talk about some of them. But supporting a plant-based diet.

There are test tube studies looking at very specific mechanisms as to why that may be the case. There are randomized trials where you randomly put people into two different groups that support a plant-based diet. So there's a whole panoply of evidence.

And one thing that I like to do is if you look to where heart disease is extremely uncommon, different populations where it's uncommon, are there things that those populations have in common, are there things that we could learn about? So for example, you could go to rural China. Or you can go to China. And this is derived from the great work from Dr. Campbell, The China Study.

And he looked at multiple populations throughout China. And he found that basically, across these populations, the less animal products you had, the less disease. The more animal products, the more disease. And it wasn't just heart disease. It was cancer. It was osteoporosis. It was inflammatory diseases.

But okay, maybe that's just China. But you can look throughout the world. So then if you bounce to South Africa, there was a really interesting study there, another population kind of study. This was done late '70s, early '80s. And they found around that time that the South African white population – and they ate a typical Western diet – milk, meat, dairy – they had among the highest rates of heart disease in the world.

But the South African black population did not. And they lived very close to each other, so it's hard to say that there was truly an environmental toxin or something like that. And they lived very close to each other, and they had much lower rates

of heart disease. And they ate largely a plant-based diet.

And to further quantify that, they looked at a hospital in Johannesburg where a lot of the South African black population would go for their care. And they looked over 10 years in the hospital records. 40,000 admissions a year, over 10 years. And they said, gosh, how many of these records have heart disease written in the record?

So they looked, and they found 30. About three zero cases over 10 years, 40,000 admissions a year. I mean, I could take you to a cardiac wing of pretty much any hospital across the US, including my own, Montefiore, and there'll be more than 30 cases of heart disease right now on the floor right at this moment.

DR. PINEDA OCHOA: Pretty endemic in the West, cardiovascular disease.

DR. OSTFELD: Yeah. I mean, it is the most common reason for adult men and adult women to die. Women are about six to seven times more likely to die from heart disease than they are from breast cancer. Now clearly, you don't want either one, but it highlights how important it is on a population level for women. But despite the fact that heart disease is the number one killer of women, only about 54% of women in the US know that, which is sad.

DR. PINEDA OCHOA: It's a problem.

DR. OSTFELD: It is. And even like there are just so many – there's so many ways to slice and dice the statistics that are scary about how common heart disease is. And there are about two heart attacks every minute in the US. And a heart attack, of course, is when part of the heart muscle dies from a cholesterol blockage from lack of blood flow. And so in your 20 minute commute to work, that's 40 heart attacks have happened on your way to work. And 40 heart attacks have happened on your 20 minute commute home from work. So they're

scary numbers.

DR. PINEDA OCHOA: It’s sad. Cardiovascular disease is something that can be easily avoided, right? Can you tell us – and you mentioned that it was scary. How ubiquitous is it? Is there are any studies that they’ve done, like to look at the vessels, just in general, the older or younger population? Like around what age do they see this disease creeping upon us here in the Western world, on a Western diet with animal products?

DR. OSTFELD: Yeah. That’s a really important question. And it’s obscenely common. There are pathology studies of 12 to 14-year-old kids in the US who died for reasons unrelated to heart disease, but about 65% of those 12 to 14-year-olds have early signs of cholesterol disease in the blood vessels that feed their hearts with blood.

DR. PINEDA OCHOA: Wow.

DR. OSTFELD: Yeah. So –

DR. PINEDA OCHOA: Age 12 to –

DR. OSTFELD: 14.

DR. PINEDA OCHOA: So teenage years. And even though they’re not displaying signs of illness, in their vessel, it’s already starting to build up these plaques [of cholesterol.]

DR. OSTFELD: So I mean – as Dr. Esselstyn has put it, when you graduate from high school, you get your diploma, but you also get heart disease in the Western world. So it’s a very interesting way of putting it. And it kind of seems accurate.

DR. PINEDA OCHOA: So basically, it’s pretty ubiquitous.

DR. OSTFELD: It’s pretty ubiquitous.

DR. PINEDA OCHOA: We shouldn’t dismiss it. It’s pretty

ubiquitous.

DR. OSTFELD: Indeed. And there are some investigators that will say, if you are 50 or 60 year old living a Western lifestyle, the chances of you having some kind of cholesterol disease in the blood vessels of your heart is astronomically high. Some people say, everybody has it. I don't know if I could say that exactly, but it's just obscenely common.

DR. PINEDA OCHOA: What are the most important nutritional advice that you ask people who would tell you, okay, I don't want to have this endemic cardiovascular disease that's killing the country? What would you tell them? If they were willing to do whatever it takes from a diet perspective, what's your specific advice?

DR. OSTFELD: So my specific advice would be to eat a whole food, plant-based diet. And I base that – and meaning no animal products. If it has a face or comes from something with a face, don't eat it. And so we encourage patients to have tons of vegetables. And ideally, at least three or more servings of green leafy vegetables each day. Three or more servings of fruit each day. Whole grains are great. Beans, lentils, chickpeas, tofu, potatoes.

In some cases, avocados and raw nuts. Salads. And instead of –

DR. PINEDA OCHOA: Fruits?

DR. OSTFELD: Fruits are great. And instead of dairy, having replacement milks, like unsweetened almond milk or unsweetened soy milk, something like that. And there are tons of incredible cookbooks and recipes out there, hundreds and hundreds of absolutely delicious recipes.

And I base this recommendation on what I believe to be a very firm, wide, and robust body of evidence. Can we use more? Sure. It's always great to get more information. And it's important to be open minded that when more information comes

in, you modify one way or the other. You don't want to be dogmatic about things. But based on the state of the evidence now, to me, it's pretty clear that a whole food, plant-based diet is the optimal way to go.

What do I base that on? There's a number of studies. One great study by Dr. Caldwell Esselstyn, where he followed – this is an observational kind of study – where he followed about 190 or so people for about four years with known cholesterol blockages in their heart, and put them on a plant-based diet. And some of them took appropriate medications as well.

And over that period of time, they had a 0.6% cardiac event rate. 0.6. And there was a small number of people in this study who did not adhere to the diet. Maybe 20 or 25 people. And of those people who did not adhere, they had about a 62% event rate. So 62 versus 0.6. It's far from subtle.

DR. PINEDA OCHOA: Wow.

DR. OSTFELD: And then you can compare, also, to other studies. And when you compare two different studies, it's a little bit of apples and oranges.

DR. PINEDA OCHOA: Let me intervene. When you talk about events, you mean heart attacks, hospitalizations, death?

DR. OSTFELD: Right. That's a good point. I mean heart attack, stroke, dying. Obviously, that's a great point. When I say events, I mean heart attack, stroke, and dying.

DR. PINEDA OCHOA: So the group that followed the plant-based diet had like less than 1% over that time of recurrent heart attacks and events. And the other group had 60%?

DR. OSTFELD: 62.

DR. PINEDA OCHOA: 62%.

DR. OSTFELD: Yeah.

DR. PINEDA OCHOA: That's powerful.

DR. OSTFELD: And then if you look at other studies, and comparing one study to another, it's a little hard to do. It's like comparing apples and oranges. But there's a really interest – but there are two studies – the COURAGE Trial [Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation], which is a very important trial in the cardiac literature, where they were looking at the role of stents and stable blockages. But in that study, the COURAGE Trial, where they had known cholesterol blockages in their heart, just like they did in Esselstyn's study, and in the COURAGE Trial they had people on maximal medical therapy, cholesterol lowering pills, blood pressure, the whole works. And they encouraged them to be healthier.

In that study, they had a 19, one nine percent, event rate – heart attack, stroke, death. This is a modern study. In Esselstyn's, where they were also on some medications, but also had the much more significant lifestyle change, they had about 8.6% event rate if they embraced the lifestyle. Really quite an impressive difference. 19.6.

DR. PINEDA OCHOA: So taking the medications might not be enough.

DR. OSTFELD: Right. Medications can definitely be very important, do a lot of good. But it's one piece of the puzzle in regard to protecting people. And we look at it as all of the above to protect people. Medications can be important. Procedures can be important. Lifestyle is unequivocally important. So it's really an all of the above, like you're saying, to help protect people.

DR. PINEDA OCHOA: And there's no side effects with having – unlike the medications, unlike the big procedures that carry some risk, there's no side effects to – so it's always good to add that diet if you're having any concerns of cardiovascular

disease, right?

DR. OSTFELD: Yeah. I mean that's a really great point. If you embrace the healthier diet, healthier lifestyle, you may have the side effect of lower blood pressure, less diabetes, less obesity, improved sexual function, improve athletic function. Those are kinds of side effects that at least I would want.

DR. PINEDA OCHOA: Of course. Who wouldn't? And cholesterol, the source of cholesterol is what?

DR. OSTFELD: The source of cholesterol is animal products. Now, our bodies make cholesterol. We need cholesterol. It's important. It's important for some of our hormones. It's important for our cell structure. But our body makes all we need.

You don't need to eat a drop. But the extra cholesterol comes from eating animal products. And that is likely one of the multiple reasons why eating animal-based foods are not healthful for us. Cholesterol is just one piece of a much bigger puzzle.

DR. PINEDA OCHOA: With regards to cholesterol, it seems like there's been a little bit of confusion introduced in the general public about – in the general – about how much dietary cholesterol can affect our cardiovascular health. I know that sometimes in medicine, we are able to design studies in a way to put a medication in a more favorable light, or cut the study short, or – what do you make of this somehow confusion that there is? And why is there this confusion that people say, well, it's been proven that cholesterol is okay now. Where are they getting this from, or why is there this confusion? Because it seems like it's pretty clear that we don't need the cholesterol. Cholesterol comes from animal products. And that our cardiovascular health is better off without it. So why is there all this confusion?

DR. OSTFELD: I think it's really unfortunate. And I think it

is reductionist thinking in a way that is detrimental for overall human health. And what I mean by reductionist thinking is, if you eat a piece of kale, for example, it has dozens and dozens of healthy nutrients in it that interact in your body in thousands of ways. But sometimes they'll say, gosh, you know, kale has vitamin C in it. So maybe that's what it is about kale that makes it healthy.

So let's just take out the vitamin C. You don't have to eat the kale anymore, just have the vitamin C. And we know time and time again that studies like that have actually found that when you take these vitamins, like perhaps vitamin E, in supplement form, or vitamin A, that it may not be helpful. In some cases it may even be harmful.

So that's what I mean by reductionist thinking. And in nutrition, it's exquisitely complicated, because these compounds, they have many – these foods have many, many nutrients that interact with each other, with enzymes, change the reaction speeds of enzymes. So the complexity is just overwhelming. So when you try to narrow it down to just one little compound, it's really not taking the big picture. And that's why these large population studies are so helpful.

Now, in terms of dietary cholesterol, I think part of the issue is that when – people kind of want to hear that unhealthy behaviors may be – reinforce unhealthy behaviors. Yeah, sure. Have that unhealthy food because the cholesterol doesn't matter. And there was some concern, some dietary guidelines committees were toying around with the term of cholesterol not being a nutrient of concern.

But interestingly, for that particular comment, they were looking at research done from the American College of Cardiology. And they looked back to – I'm going to have the details off a teeny bit, but they looked back to about 1998. And they didn't find anything necessarily supporting cholesterol being a nutrient of concern. But in 1997, there

was a meta analysis to support that cholesterol was a nutrient of concern.

But you know what, let's just pretend for one second that cholesterol is not a nutrient of concern, which is not the case. And we also know that if you have higher cholesterol levels in your body, you do worse from a cardiovascular sense – heart attacks and strokes. And cholesterol is one piece of a much larger puzzle why we have these problems – inflammation and other things. We know if you lower cholesterol levels, you do better. So there's lots of evidence supporting that as well.

But let's just pretend for a second for dietary cholesterol is not a nutrient of concern. But when is the last time you went to a restaurant and said, gosh, you know, I'd love a bowl of cholesterol. Can I just have a bowl of cholesterol? I'd like it hot and maybe a little cinnamon on top. That just doesn't exist.

You eat cholesterol in the context of the food, whether it's dairy, or whether it's red meat, and it comes with all the other aspects of those foods that are unhealthy for you. Promote inflammation, can worsen blood vessel function, can acidify the blood, and increase things like trimethylamine amine oxide, which is not your friend. And on and on.

So even if we pretend that cholesterol is not a nutrient of concern, which I do not believe to be the case at all, and I believe the evidence will support that, but putting that aside, you're still eating all those other unhealthy things in those foods. So it's still not your friend, not something you, in my opinion, would want to do.

DR. PINEDA OCHOA: I think you mentioned earlier endotoxins that are coming in meat and animal products. So tell us some of the things that we get that we wouldn't want to have in animal products – in eggs, or chicken, or red meat, or

whatever. What are some of the compounds that pathophysiologically don't help our health in general that we find?

DR. OSTFELD: Yeah. That's a great question. So when you look at these big population studies that support that when you eat a plant-based diet you're healthier, and when you eat a non-plant-based diet, you're unhealthy. A key question is, well, why is that the case? Is there some mechanism to support that?

There are multiple mechanisms to support that. And let's go through a few. One is called TMAO, or trimethylamine oxide. So what in the world – who cares? Who cares? So trimethylamine oxide is not your friend. Trimethylamine oxide can make your cholesterol levels go up, and it can help cholesterol deposit in the blood vessels in your body exactly where you do not want it.

And when you – I'll take a step back. You have a blood vessel, and the inner lining of that blood vessel is called the endothelial cell. That cell is your friend and you want to treat it well. Because it can protect your blood vessels. And if I were to take all the endothelial cells out of my body and lay them on the ground, there would be about seven tennis courts worth.

And we have about 60,000 miles of blood vessels in our bodies.

DR. PINEDA OCHOA: Wow, 60,000 miles.

DR. OSTFELD: Yeah, I didn't count it. I got that off of a cardiology hospital's website. So taking their word for it. So it's no wonder if you treat your blood vessels well, you're endothelial cells well, you treat every square millimeter of your body well. But if those endothelial cells get damaged, which they can through animal products, eating animal products, through smoking, through pollution, cholesterol in your blood can burrow into the wall of the blood vessel and become oxidized, where it is irritating like a splinter.

And when that happens – if you ever had a splinter, you get all red and inflamed. Well, it's same kind of thing, but in the wall of your artery, exactly where you do not want it. And then these plaques can grow and grow and damage the blood vessel and damage the blood vessel. That's the kind of disease process that we were talking about in the 12 to 14-year-olds. It's happening so young.

And that kind of thing, it makes your body less healthy, your blood vessels less healthy. And over time can lead to heart attack, stroke, other problems with your blood vessels. An analogy has been made, you know, when we're born, our bodies are turbo engines. And a whole bunch of animal products later, we turn them into clunkers.

So TMAO, why are we talking about that? Well, TMAO, it can help cholesterol deposit in the wall of your blood vessels. We know that the higher your TMAO level in your body, the worse your vascular outcomes are – heart attack, that kind of thing. And also, recently it's been identified that TMAO can make your blood more sticky, more likely to clot, which is not a good thing in the context of heart disease.

DR. PINEDA OCHOA: Of anything.

DR. OSTFELD: Pretty much. And so what? What can we do about it? Well, some investigators did an interesting study. And they took people who are omnivores, meaning they eat everything, and they took self-described vegans, and they essentially fed them red meat. And they found that the omnivores made a good bit of trimethylamine oxide, but the vegans made virtually none.

So what in the world is going on? Well, it turns out what's going on is our gut bacteria is what's going on. Now, we each have about a trillion gut bacteria. So there are a lot of them. But it turns out subtle differences in the gut bacteria between the vegans and the omnivores is what accounts for that

difference, meaning the omnivores have more of the gut bacteria that lead to the formation of TMAO, which is not your friend, and the vegans have much less.

Now interestingly, in the red meat, it's felt that perhaps l-carnitine in the red meat is the source of what leads the trimethylamine oxide. And l-carnitine is structurally similar to choline. Who cares? Well it turns out that choline is in dairy. Choline is in fish. Choline is in eggs, the yellow part of eggs.

DR. PINEDA OCHOA: Is there any choline in plant foods?

DR. OSTFELD: There is, but – so when you eat those animal products with choline, that leads to trimethylamine oxide formation.

DR. PINEDA OCHOA: In your gut bacteria?

DR. OSTFELD: Well, the gut bacteria interact with the choline, and through a handful of steps in your body, including your liver, leads to the formation of trimethylamine oxide, which is not your friend, but –

DR. PINEDA OCHOA: Which helps the cholesterol deposit in our vessels.

DR. OSTFELD: Which helps cholesterol deposits in the vessels, can raise cholesterol levels, and make our blood stickier. But choline is a required nutrient. But the good news is you can get it from plants. But I just said that if you eat choline, that can lead to the formation of trimethylamine oxide.

Well, when you eat a plant-based diet, like the vegans in that study, you select from very, very little of the gut bacteria that can lead to the formation of TMAO, so you make virtually none. So when you're eating a plant-based –

DR. PINEDA OCHOA: Virtually no TMAO?

DR. OSTFELD: Virtually no TMAO. So when you eat a plant-based diet, you are getting tons – you're getting the required choline that you need, as well as tons and tons of other nutrients. But it's as if the plants are also creating a coat of armor, if you will, in your belly, protecting you, helping you get the choline that you need. So trimethylamine oxide is one.

And it's important, your gut bacteria can change around very quickly. So if you go back, if you take a trip and you have a whole bunch of animal products or something, your gut bacteria can begin to change in a day or two. So trimethylamine oxide is one thing.

DR. PINEDA OCHOA: So it's a very important one, and it has to do with our gut bacteria. Then eating animal products results in us having more of a pathologic – well, the bad bacteria in our guts that raises the levels of TMAO. Okay.

DR. OSTFELD: Exactly.

DR. PINEDA OCHOA: That's very interesting.

DR. OSTFELD: Then inflammation, of course, promotes all aspects of atherosclerosis or cholesterol disease in the blood vessels in your body, from it starting, to growing, to heart attacks. And we know, for a variety of reasons, when you eat animal-based foods, you promote more inflammation in your body. And plant-based foods promote less, protecting you.

Interestingly – there's so many interesting mechanisms. There is a relatively newer one just identified. And there's a compound that's called Neu5Gc. And also, if we have time, I'd love to talk a little bit more about HDL, the good cholesterol, and LDL. But there's a new compound – well, not new, but newly identified compound called Neu5Gc, which is a carbohydrate or a sugar that lives in the bodies of carnivores, true carnivores.

But we don’t have it naturally in our body, which I also think supports the fact that we are not evolved to be true carnivores. But be that as it may, some investigators in San Diego noticed that when we –

DR. PINEDA OCHOA: Let me just ask you. So they have it in their blood? Like they just measure it or where is –

DR. OSTFELD: Oh yes, That’s a good question. It’s part of the cell.

DR. PINEDA OCHOA: Oh, okay. It’s part of the cell. Okay. And we don’t have it?

DR. OSTFELD: We don’t have it.

DR. PINEDA OCHOA: But natural carnivores –

DR. OSTFELD: Do.

DR. PINEDA OCHOA: – do? Okay.

DR. OSTFELD: And it’s really very interesting. And I’m certainly no expert in Neu5Gc, but there is wonderful work out of UCSD for anyone who’s interested in diving more into it. They’ve published a wonderful paper on it, which is what I’m basing my understanding of this on.

And so they noticed that true carnivores who have the Neu5Gc sugar in their body, they really don’t seem to get much cancer when they eat animal products. But when we do, it is associated with more cancer. And they said, well, maybe the difference in Neu5Gc, that we don’t have it and true carnivores do have it, maybe that somehow accounts for the difference in cancer rates, meaning higher in us and lower in them.

Well, why might that be the case? Well, if we eat Neu5Gc, we eat an animal with Neu5Gc, our body may see that as foreign and attack it, creating an increased immune response, more

inflammation. And maybe it's that that has something to do with the difference in cancer.

So they created an animal model, one normal with the Neu5Gc and one without. And they fed the meat, normal meat with the Neu5Gc. And they found that in the animal model that they engineered to not have Neu5Gc just like us, they had substantially more liver cancer than did the normal animal. And they had more inflammation, more immune reaction.

So maybe that has something to do with the Neu5Gc. But interestingly, these investigators speculated even further. And what they said is, gosh, inflammation is associated with promoting heart disease and diabetes. So maybe this Neu5Gc difference, this inflammation that's created in us with Neu5Gc also can, at least in part, account for the higher rates of diabetes we see in people who eat animal products and the higher rate of heart disease in people who eat animal products. So it's very, very interesting.

DR. PINEDA OCHOA: That's fascinating. And we don't have that.

DR. OSTFELD: We don't it.

DR. PINEDA OCHOA: Humans don't have it.

DR. OSTFELD: At least according to this article. So there's trimethylamin oxide, there's Neu5Gc. And so we can touch base on HDL, the good cholesterol. So we're always taught higher HDL good cholesterol is your friend. And from a 10,000 foot view, that's quite true.

Higher is better. It's not always the case. There are some unique genetic changes that may make that not the case in some situations. But from a 10,000 foot view, that's indeed the case.

And interestingly, I have quite a few patients – and it's been also well described – who when they eat more healthy, a plant-

based diet, they do much better. Their bad cholesterol falls. They feel so much better. But yet, their good cholesterol, the HDL falls.

What's going on? When you eat a typical Western diet, a standard American diet, it can make your HDL particles less healthy for you and promote cholesterol disease in the wall of your blood vessels. They become more inflammatory, create more oxidative stress.

But when you eat a plant-based diet, it's been well described that although the number of HDL particles can fall, they have improved efflux capacity, more vacuum cleaner capacity, thereby being more protective. And very interestingly, there's a new study that came out about three weeks ago in the American Journal of Cardiology. And they looked at people with known heart disease, and they looked at their HDL efflux capacity, meaning its vacuum cleaner ability. And the better vacuum cleaner it was, the better efflux capacity, the lower your rate of heart disease in the future.

And it was independent of the HDL number. So if your HDL number was 40 or 20, it didn't matter. What mattered was the efflux capacity.

DR. PINEDA OCHOA: How efficient the HDL is at sucking cholesterol from your vessels.

DR. OSTFELD: Yes. So it's very, very interesting. And it's a common theme in life. You know, the devil's in the details. You can look at something from a 10,000 foot point of view and think you understand it. But then when you dive down into the details, there's usually way much more going on. And this HDL theme is just another example on that common theme in life.

And interestingly – so we also talked about the LDL cholesterol, the bad cholesterol. When you damage those endothelial cells, whether through a toxic Western diet – we can get into that as well – or pollution or smoking, the LDL

particles from the blood vessel can then burrow into the wall of your blood vessel, become oxidized, act like a splinter and damage the health of your blood vessels. That process of the LDL particle getting oxidized and turning into a splinter is harder to do when you eat a plant-based diet. So yet it's another way that your body – a plant-based diet can protect you.

Now, another whole other potential fascinating area of possible protective value is genetics. And I'm going to extrapolate a little bit from related studies, so it's not specifically heart disease. But it's incredibly fascinating. Now, we all have our genes.

DR. PINEDA OCHOA: Let me just ask you, before you move on from the LDL and HDL. People get confused. They say, well, eggs have only the good cholesterol. There seems to be a misunderstanding that people think that there's a bad and a good cholesterol. When you say HDL and LDL, they only contain, to my understanding, biochemically, there's just one type of cholesterol.

But when they talk about HDL, it's just the lipoprotein, where it's going to, where it's coming from, the density. But it's just one type of cholesterol. And the good one is the one that's coming from the outside to the liver. And the bad one is the one that's going to the vessels.

DR. OSTFELD: I think that's a great explanation. And it's the lipoproteins and the structure of these particles that carry the cholesterol, whether it's HDL or LDL, that sort of dictate the activity that it's going to have. But yeah. That's a great point.

And so from a 10,000 foot point of view, the LDL cholesterol particle which holds cholesterol – cholesterol is cholesterol. It just has a molecular structure. But the LDL which holds the bad cholesterol, that's not your friend. And the HDL, 10,000

foot view, is your friend. But you're right, cholesterol just is a molecular structure.

And so in regard to genetics being potentially helpful, we all have our genes that make our eye color our eye color, and our hair color our hair color. And we can't change our genes. But we may be able to change which genes speak. Meaning make healthier genes speak more loudly and unhealthy ones speak more softly.

What am I talking about?

DR. PINEDA OCHOA: That's excellent.

DR. OSTFELD: It's just amazing. And so this is great work from Dr. Ornish and others where they looked at people with – men with early stage prostate cancer. And they said, okay. Let's take these guys. I think they took about 30 of them and they put them on a much healthier lifestyle. Almost exclusively a plant-based diet, exercise, and some other healthy activities.

And they biopsied the prostate at the beginning and after about three months. And they found that after three months, dozens of anti-cancer genes were expressed more, meaning speaking more loudly, and hundreds of pro-cancer genes were expressed less, meaning speaking more softly. So it's amazing.

So we may not be able to change our genes, but we may be able to change which ones speak. And that the theme may apply in other aspects of health as well, but I'm speculating there. But this genetic thing we're talking about, turning the healthy genes on, the unhealthy ones off, that switch, it turns out, at least in animal models, that that switch can be passed on to our kids and grandkids.

So the foods that you eat today, it's not only incredibly important for your health, the environment, but also potentially, according to animal models, the health of your kids and grandkids. It's really quite mind blowing.

DR. PINEDA OCHOA: With regards to – I don't know if I interrupted you. You were talking about also the elements that, per se, were bad from animal products. You mentioned the carbohydrate that carnivorous animals have.

DR. OSTFELD: Neu5Gc.

DR. PINEDA OCHOA: And you mentioned TMAO. Is there anything else that's problematic from animals?

DR. OSTFELD: Yes. The list goes on and on. And the animal protein itself is very acid forming in the body, which may lead to osteoporosis. And interestingly, there are epidemiologic studies, population-based studies, that show the more dairy you have, the more osteoporosis or fractures you have. It's really quite fascinating.

And so that animal protein may lead to acidifying the blood and weakening your bones. There are a number of studies that show that animal protein particular casein, which is the primary animal protein in dairy can, at least in animal models, promote cancer growth. And when you take away the casein, cancer may shrink. So it's really quite interesting that just modulating your diet may impact cancer.

DR. PINEDA OCHOA: So I've seen those studies where they actually modulate the rate of cancer cells, the increase or decrease, just by this casein protein, which is a main protein in dairy, even more so than the carcinogen in some cases.

DR. OSTFELD: Yes, those are great points. And that study that you're talking about is, of course, the one by Dr. Campbell where he took, I believe it was rats, and created a rat liver cancer model. And the number of clusters would increase when he fed them the diet with 20% casein. And the numbers would go down when he fed them a diet with 5% casein. And up and down and up and down it would go as he changed the percentage around.

DR. PINEDA OCHOA: So it’s definitely something that we don’t want to be eating, something that would stimulate cancer.

DR. OSTFELD: Well, there’s certainly a lot of – I agree with you, there’s a lot of reasons not to.

DR. PINEDA OCHOA: For sure. I’ve come across studies that mention heme iron. There’s people, they’ll say, well, I need to eat red meat. I need to eat meat because I need to get iron in my blood. I’ll be anemic if I don’t. What’s your reaction to that?

DR. OSTFELD: Iron’s important. They’re absolutely right. And when we eat iron, it comes in a couple of different forms, or a few forms. There’s 3 plus form. And I’m blanking on if it ferric or ferrous right now.

DR. PINEDA OCHOA: I don’t remember. There’s one that’s ferrous, one that’s ferric. One is two, one is three. I don’t remember.

DR. OSTFELD: And so there’s a form of iron that predominantly comes from animal products. And then there’s a form of iron that comes from plant products. And the form of iron that comes predominantly from animal products is very inflammatory for the body, creates oxidative stress, creates inflammation. And having more of that is associated with more diabetes, more inflammation.

But the kind that comes from plant products is not. And you can get tons of iron from plant products. And there’s a wonderful table in The China Study where they looked at 500 calories from animal-based foods and 500 calories from plant-based foods. And in that table, there’s more iron in the plant-based foods than animal-based foods.

The one issue is that the type of iron from plant-based foods, it’s not absorbed as well in the body. But if you take it with some vitamin C, a little lemon, that will help and that will

absorb it. And to my knowledge, anemia from iron deficiency is not more common in people who eat a plant-based diet. So it's really just a misnomer.

DR. PINEDA OCHOA: I see. I see. But you personally, is that something that you worry about, like constantly putting lime like into your food? Or you pretty much just eat plenty of plant foods and your hemoglobin is –

DR. OSTFELD: I don't worry about it for one second. I suppose if somebody ate only romaine lettuce all day every day, like maybe there would be some sort of issue. Much like if you ate only one animal product all day every day, you would definitely have some nutritional issue.

But nobody does that. And so by having a varied whole food, plant-based diet, I don't worry about it for a second. And I have – at least personally, so this is somewhat anecdotal – but personally, I have hundreds of patients who are embracing this to varying degrees. And I have seen no cases of iron deficiency anemia that I can ascribe to the diet. Now, people can get it for other reasons. Like if they have some internal bleeding. But specifically from the diet, I have not seen a case.

DR. PINEDA OCHOA: And speaking about deficiencies, the concern about vitamin B12, is that something that comes up with your patients who go on a plant-based vegan diet? And what is your reaction to somebody that would tell you, well, is that something that we should watch for? How is this a natural diet that we're supposed to eat if we should watch for vitamin B12?

DR. OSTFELD: That's a very important point. And it's important to know, of course, eating a plant-based diet is the most nutrient dense way we can eat. Much more nutrient dense, and I mean that in a good way, much more nutrient dense than a standard American diet.

But B12 is definitely very important. And B12 lives in the

soil. And animals get it because they eat soil or they eat other animals. And we used to get it when we would eat root vegetables, because we didn't clean them off as much. And so you'd get it from the soil that was on the root vegetable.

DR. PINEDA OCHOA: In the bacteria from the soil. So in this soil – in the bacteria in the soil, right? That's who makes it.

DR. OSTFELD: Exactly right. And so now that our lives are much more hermetically sealed, we don't get that bacteria, that dirt, that soil with the B12. So all you need to do is take a supplement. And what I do is I encourage my patients to start taking 500 micrograms of B12, preferably in the methylcobalamin cabalamin form, because my understanding is that that's better absorbed.

And then I check a level. But usually, if you have normal absorption, you typically have a three or so year store in your body of B12 if you've been eating a standard Western diet. So it's not anything you have to worry about right away. And your doctor can check a level and it's no big deal.

So to the comment of, well, we need B12. A vegan diet doesn't have it, so we're not meant to eat a vegan diet, I just completely disagree with that. Because the reason we don't have the B12 now is just because the root vegetables are washed so much, and the bacteria and the B12 in soil are gone. So had we been eating it without the washing, we'd get the B12.

DR. PINEDA OCHOA: That makes a lot of sense. And also, Dr. Ostfeld, do you get a lot of concerns about – or what is your reaction to somebody that would say, well, but we are omnivores? We evolved to eat meat. Our brains grew because we ate meat. So why should we stop eating meat now?

And the second question to that is are you familiar with the cardiologist William C. Roberts?

DR. OSTFELD: Yes, the editor in chief of the American Journal of Cardiology, I believe.

DR. PINEDA OCHOA: Yeah. He is in Baylor, and he used to be at National Institutes of Health. He published a paper – I know he's published I think –

DR. OSTFELD: Like over a thousand. He's an amazing guy.

DR. PINEDA OCHOA: -over a thousand papers. He's probably one of the most published in peer review, so very prominent physician with pathology and cardiology background. He published a paper. And he said in this paper that even though humans behave like omnivores, he looked that the physiologic and anatomic characteristics, and he said that humans actually had characteristics more compatible with herbivorous animals.

And he talked about how only carnivorous animals accumulate atherosclerosis – I mean, carnivorous animals didn't accumulate atherosclerosis. So what is your reaction to his comments saying that we are more, in general, herbivorous? And what is your reaction to when somebody says that we are omnivores, and we evolved and our brains grew because of eating meat?

DR. OSTFELD: Well, Dr. Roberts is very wise. And I certainly would never claim to have information beyond what he has. But I completely agree with him. I think that his comments are spot on. And far be it from me to correct his comments.

And he has also commented that when people have a total cholesterol less than 150, which is exquisitely more common on a plant-based diet, the chances of having heart disease is incredibly low. So I agree with him completely that we are much more designed to be herbivores.

Now, in regard to the we evolved to be omnivore comment, I disagree with a lot of that. Not all, but a lot of that. I think most populations, our real early ancestors, thousands,

if not millions of years ago, ate primarily a plant-based diet. And they probably had a little bit of meat from time to time. I can't imagine a lot. I mean, it's kind of hard to catch a cheetah.

But from time to time, did have some animal products. But primarily, plant-based. Why do I say that? I say that for a few reasons. One, there is anthropologic or artifact data on when they looked at cooking tools of people who lived in that time, and they found a lot of starch-based product. So they found starch-based products on the mortar and pestle, and things like that.

And they looked at the plaque in the teeth of the people who died in that era and they found carbohydrates from plants, not from animals. But those early populations probably did have some. And so evolutionarily, though, if you look at a carnivore versus us, we're actually quite different. So I think we did evolve to be much more herbivores.

How are we different? First, carnivores have many more canine teeth. We don't have that. We have more molars to grind, which is necessary when you're eating a plant-based product. We have something called salivary amylase, which carnivores don't have. And that helps to digest, begin the digestion, of carbohydrates. And true carnivores don't need that.

The pH, the acid, of the true carnivores, much more than ours. Why might that be the case? Teleologically, because if you have putrid flesh sitting in your body, you want to be able to go after it with that acid to kind of kill bacteria and things like that. And so the true carnivores have more acid than we do.

And accordingly, their GI tracks, their gut and intestines is shorter than ours, because first, you wouldn't necessarily want putrid flesh sitting in there for an extended period of time because you may react with some of the bacteria in there.

This is teleologic, of course. But it’s also harder to digest carbohydrates. So our GI tracks may need to be longer simply to be able to facilitate that.

So I believe we evolved much more in a herbivore, vegan kind of direction, if you will. And in regard to brain development, there’s a very interesting, relatively new study that temporally – it was published in a premier medical journal. I apologize, I don’t remember the name of the journal right now. But published a premier scientific journal, where they temporally associated significant human brain growth to eating more carbohydrates, not animal products. So it suggests that our particular brain growth, perhaps different than other animals, may actually be related to eating more carbohydrates, as opposed to animal products.

DR. PINEDA OCHOA: Congratulations on their wonderful, wonderful work that you are doing, both with your patients and getting this so important information out there to help so many people. Congratulations and just thank you so much. And please continue doing your wonderful work. And thank you. And thank you for spending time with us today, Dr. Ostfeld. We really appreciate it.

DR. OSTFELD: Great. Well, thank you so much. It’s been an honor to be here.

This transcript is an approximation of the audio in above video. To hear the audio, please play the video.