A Grain Brain Approach to Heart Health
Guest: Dr. David Perlmutter

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Dr. Mark Menolascino: Welcome to the Women's Heart Health Summit. I'm your host, Dr. Mark Menolascino, medical director of the Meno Clinic in Jackson Hole, Wyoming. This is your chance to hear from international experts about how to achieve optimal vitality, optimal heart health, and prevent heart disease. We're fortunate to be joined today by Dr. David Perlmutter. Thank you, David.

Dr. David Perlmutter: I am delighted to be here.

Dr. Menolascino: Let me tell our viewers a little bit about you. I've known you for a decade. One of my favorite speakers to listen to at all the conferences you go to. I remember one time you made a point about brain and inflammation. And thunder went off rolling in the conference arena. And so you're connected at a higher level, too.

Dr. Perlmutter: Oh, I don't remember that. But that sounds great.

Dr. Menolascino: Dr. David Perlmutter is a board-certified neurologist and four-time *New York Times* bestselling author. He serves on the board of directors and is a fellow of the American College of Nutrition. Dr. Perlmutter received his medical degree from the University of Miami School of Medicine where he was awarded the Leonard G. Rowntree Research Award. He serves as a member of the editorial board for *The Journal of Alzheimer's Disease* and has

published extensively in peer-reviewed scientific journals including *Archives of Neurology*, *Neurosurgery*, and *The Journal of Applied Nutrition*. In addition, he is a frequent lecturer at symposia sponsored by institutions such as the World Bank, the IMF, Columbia University, Scripps Institute, New York University, Harvard University, and serves as an associate professor at the University of Miami Miller School of Medicine.

His books have been published in 34 languages and include the #1 *New York Times* bestseller *Grain Brain*, also *The Surprising Truth About Wheat, Carbs and Sugar*, with over 1 million copies in print. He is the editor of the upcoming collection *The Microbiome and the Brain* that will be authored by top experts in the field and will be published in 2019 by CRC Press.

So again, David, I am super appreciative of you joining us today. And the work that you're doing, the message that you're spreading is really taking a lot of people by surprise. But the more they look into it, the more they know that you're right.

Dr. Perlmutter: Well, first again, thank you for having me. And while the intro, I think, would depict me as being really focused on the brain and focused on neurology, which is certainly what I've done all these years, I think it's really important for your viewers to understand that these processes that affect the brain are the exact same pathways and processes and mechanisms that damage the heart.

So I don't know if the thunderclap is going to go off now when I mention inflammation. But as I mention it in reference to the brain being that fundamental mechanism that underlies things like Parkinson's and Alzheimer's, let's be clear that this process of inflammation is front and center as it relates to what damages the arteries, the blood supply to the heart.

And really what is the primary cause of cardiovascular disease in men and women? And I think the purpose of this summit is really very, very important because I think the notion that cardiovascular disease is a male-related thing is a carryover from the 60s and 70s when men would be working hard and have a heart attack. And no one knew why.

And the truth of the matter is, here in America, the third leading cause of death in women is that they die of cardiovascular disease. A lot of it, as much as 80% of that cardiovascular disease, is actually preventable. And uniquely and interestingly, those ideas that relate to prevention of cardiovascular

disease in women are the same ideas that we talk about that relate to other inflammation issues like Alzheimer's, obviously a brain issue.

So it's not as if a lifestyle pursuit might be good for one part of the body but bad for the other part. It's really, as we move forward in time, interesting to watch how there is such convergence in the recommendations for the brain, for the heart, for the immune system, for controlling blood sugar, etc.

Dr. Menolascino: Well, you've really hit on such a good point. And I know we see this with our clients. A lot of women, particularly, come in. They're not really concerned about their heart health. But they're concerned about their cognitive or brain health. They're not really worried about when they're going to have a heart attack or not. But they're deathly afraid of whether they're going to have cognitive impairment or dementia or Alzheimer's because it's all around us.

And that sometimes is a way to start the discussion of the heart or the gut or of hormones to really have an opening dialogue of how to talk about the rest of the body.

Dr. Perlmutter: Well, again, the fundamental mechanism is inflammatory. And this is what underlies chronic, degenerative diseases whether they be involving the heart, the brain, the immune system, related to cancer, diabetes, you name it. And the World Health Organization now characterizes chronic, degenerative conditions—which are they didn't say, inflammation related, but I'm saying it now—as the number one cause of death on planet Earth, not infectious plagues and war, etc.

We're just falling apart with reference to heart disease and brain disease, cancer, diabetes in relationship to the lifestyle changes that are so prevalent globally now which used to be looked upon favorably, called westernization. But now we understand that, as third world countries adopt the western world's diets, then their rates of cardiovascular disease and stroke and Alzheimer's, etc. are in lockstep with those seemingly salubrious changes which we now recognize are anything but.

So there's not been a sudden genetic shift globally that explains this incredible increase in these conditions. It is environmental, meaning foods that we eat, levels of physical activity, other issues in the environment that are, by and large, controllable and modifiable. And that is, I think, front and center in terms of what you're trying to accomplish with this summit—that is, to tell people that it doesn't have to be this way.

I mentioned earlier that as much as 80% of cardiovascular disease in women is preventable. And to recognize that as many as 90% of women here in America may have an important risk factor for cardiovascular disease, my goodness! We have to really get this message out. That's the mission here.

Dr. Menolascino: Well, you mentioned genetics. I think that's something that a lot of our clients don't really understand the impact of. And when I trained in Phoenix, I met some Native Americans, the Pima Indians, who several generations ago were warrior genes who were lean and lived in one of the most inhospitable environments on the planet and survived. Now, with the lifestyle changes of white flour, white sugar, they have the highest rates of obesity and diabetes that we've ever seen. So how the genes not change but the ecosystem around did.

Dr. Perlmutter: That's right. And I was actually there the day before yesterday, oddly enough. And what you're saying is not just true about the Pima but many indigenous cultures around the globe. Certainly, if you visit northern New Zealand, you're able to experience that as well.

And I think what we're talking about is that these individuals carry what we call the thrifty gene which is a genetic array that allows them to be able to survive in conditions of caloric scarcity. I.e. when there are not adequate amounts of food available for these individuals, their bodies are able to extract calories from the minimal amounts of foods that they have and preserve their bodies by virtue of making fat under adverse conditions which allows them to survive.

Well, it turned the tables on that gene today when calories are overabundant. But yet, the gene switch is still on. And so they make fat. And they hold onto fat. And they can't break it down and use it as a fuel source.

And you're right. I was involved in a production of a movie called *The Magic Pill* that is now on YouTube.

Dr. Menolascino: That's great.

Dr. Perlmutter: And in that movie, we discuss the indigenous individuals living in Australia and how they have been so incredibly affected, as you say, by obesity and diabetes, by suddenly being exposed to a westernized diet and how that has negatively affected them.

So again, I really want your viewers to take home the notion that this profound epidemic of cardiovascular disease in women, and particularly understanding that in African American women, is the number one cause of death in America. And by and large, it is preventable.

We've got to understand that we are creating a generation of diabetics basically. The dietary shift that has happened over the past 30 years here in America, by making us fat-phobic, has caused us to shift our diets in favor of carbohydrates. And that is clearly responsible for this absolute epidemic of diabetes that we are seeing.

So we've got to relate becoming diabetic with profound risk for cardiovascular disease. The risk is increased three to fourfold in women, risk of cardiovascular disease, if a woman becomes a diabetic and only two to threefold in men. Only. That's huge, but it's more so in women. So you don't want to become diabetic.

And there are a couple of things that need to be looked at that are involved in risk increase for women to become diabetic. Again, women should do everything they can not to become diabetic. That means a diet that has more fat and fewer carbohydrates.

But here's another very important point that women need to recognize—taking a statin drug. According to the Women's Health Initiative study that was published in 2017, women taking a statin medication which presumably is good for their heart have a 71% increased risk for becoming diabetic which is associated with a three to fourfold increased risk for cardiovascular disease. Somebody has to yell that out from the highest mountain.

It's very sad that women now roll into their doctor's office and have high cholesterol. And the doctor says, "That's a risk factor for heart disease. We need to put you on a statin drug because we need to intervene to control one blood marker whereby we are going to increase by 71% your risk for diabetes," associated with a three to fourfold increased risk for the very disease that they're trying to prevent.

Dr. Menolascino: That's one of the biggest paradoxes in medicine right now, isn't it?

Dr. Perlmutter: Oh my gosh! It's an extremely myopic approach that is really beyond myopic. It's paradoxical.

Dr. Menolascino: David, you've really taught me to fall in love with my mitochondria. You were one of the first people who really opened my eyes to how important the mitochondria are and how susceptible they are to toxicity by drugs like the statin drugs or by our environmental toxins and how they can lead to these neurologic illnesses, blood sugar dysregulation, heart issues, Alzheimer's issues.

You talked about how when we were in the caveman/cavewoman days, the inflammation helped us to protect us against bugs. But that inflammatory response is now hindering us when we bathe it with all of the processed foods and lack of activity and all of the other things. How do you tie that together for people in a way they can understand? Do you have a good way to tie the genes to—

Dr. Perlmutter: You'll have to determine whether it's good or bad. Let's take a step back. As we talk about inflammation and as we are being very derogatory about it, understand it's a very important process in the body that helps us deal with invading organisms, with trauma, etc. We want to wall off areas. And we want to recruit blood supply and white blood cells to areas of damage or infection. That's for sure. That's the upside of inflammation.

But the downside is that this chronic exposure to these inflammatory chemicals damages the body in many significant ways. You mentioned mitochondria. We know that these chemicals of inflammation that we call cytokines or, now more appropriately, adipokines (as they are fat derived) are directly toxic to mitochondria. And also very important, vis-à-vis our earlier conversation, that inflammation tends to target what's called the insulin receptor, making it less functional and, as such, tends to drive up blood sugar which does what? Makes more inflammation.

So it becomes what we call a feed forward cycle. Becoming diabetic increases inflammation. Inflammation makes you more diabetic, raises your blood sugar. So that is a carousel that you don't want to get on. And if you do get on, there's a way off. And we'll talk about that in just a little bit.

But you bring up an interesting point about the mitochondria. And we learned years ago, and it's certainly being taught in high school biology, that these mitochondria are the power plants of our cells. And they are. But they are far more than that. They are actually involved in keeping a cell alive, regulating the mechanisms in a cell that determine whether it will live or die. We call that the apoptosis genetic pathway which will cause a cell to die.

We also know that mitochondria are directly involved in regulating inflammation. Mitochondria control what has been now called the inflammasome which is the gatekeeper for the inflammatory cascades that occur in our bodies. Defects in how our energy plants, the mitochondria, work are sensed by this inflammasome. If any of you techies are listening, it's through what's called mTOR, the mitochondria target of rapamycin, if you want to look that one up (M-T-O-R).

Dr. Menolascino: We'll memorize that. Quiz later.

Dr. Perlmutter: That's the signal where the gate is. But how intriguing it is that our energy-producing organelles that live in the cell—and each cell may have as many as a thousand mitochondria—do far more than make energy. They're regulating inflammation in the body.

And once again, we have a dangerous what we call feed forward cascade. It's that if the mitochondria are dysfunctional, they'll create increased free radicals, reactive oxygen species, that stimulate the inflammasome to make higher levels of cytokines, the inflammatory chemicals, which do two things. They feed back and damage the mitochondria, setting into motion this feed forward cascade. And as mentioned, the irritate the insulin receptor.

Now, the insulin receptor then can't do its job to help lower our blood sugar. But well beyond that, we know that damaging the insulin receptor (in other words, the receptor that mediates how insulin works in our body) has very profound brain implications as well, certainly an area of interest for me.

But beyond that, when the insulin receptor is compromised, insulin doesn't work as well. When insulin doesn't work as well, our blood sugar goes up. And elevated blood sugar then ultimately becomes a diagnosed issues called type 2 diabetes. And as mentioned earlier, type 2 diabetes increases a woman's risk for cardiovascular disease by three to fourfold.

So this is a powerful relationship then between problems with how our energy-producing issues, the mitochondria, work and ultimately developing diabetes and cardiovascular disease. So we've got to take good care of our mitochondria. And that is, we've got to adopt a diet that's lower in carbs, lower in sugar, and has higher levels of—dare I say—the dreaded fat. That is the diet humans have been on for a couple million years. And contrary to what we've been told for the past three or four decades, that is the diet that's good for the heart.

Dr. Menolascino: So David, what are the good fats and bad fats that you tell people that they should avoid or they should incorporate? Because there seems to be a lot of different advice about what fats should be? It was low fat. Then it was keto. Now, how do you individualize that for your clients?

Dr. Perlmutter: First of all, globally I think we should recognize that fat is our friend and has really been our friend for as long as we've walked this planet. Most of our calories in our history have come from fat. And suddenly, a millisecond ago, we were told fat is terrible. We shouldn't eat fat. We should eat more carbs. That was the message that was delivered to us through our peer-reviewed medical journals, now learning that those studies were underwritten by industry, the sugar industry, which wanted us to eat more sugar and eat less fat. And I believe that is responsible for more death on this planet than both world wars combined.

Dr. Menolascino: That's an interesting statement.

Dr. Perlmutter: The shift away from fat and into carbohydrates has paved the way for this beyond epidemic proportion of these chronic, degenerative conditions, as I discussed earlier.

So you bring up a very good point, Mark. And that is that there are fats that are healthful for us and some which are dangerous. By and large, the vegetable oils that you might see on your grocery store shelf (the safflower oil, canola oil, sunflower oil, etc., corn oil especially) should be avoided like the plague for a number of reasons. Most of these are sourced from genetically modified plants. That is an issue because those plants have been sprayed with a significant toxin called glyphosate or its analogs to kill weeds. And that is residual in these and other plants that are genetically modified. That will get back to the gut—and we'll talk about that perhaps a little bit later—and increase inflammation.

Beyond that, though, these fats that are modified to have their shelf life forever in the grocery store are used by the body if that's what you're consuming and create cell membranes that are not as functional as they could be.

So we should be favoring good sources of unprocessed, for example monounsaturated fats like you might find in avocado oil or by eating avocadoes and certainly olive oil. That's the original. Olive oil is about the healthiest type of fat you can imagine. Do not fear saturated fat. In a recent study that looked at the dietary habits across five continents, it was shown

that higher levels of saturated fat were associated with a 20% reduction in risk for death. You remember?

Dr. Menolascino: I do.

Dr. Perlmutter: When we were told saturated was terrible? And here we are now, recommending things like eggs and coconut oil and MCT oil that have saturated fat in them. 50% of the fat in human breast milk is saturated fat. So if you are castigating saturated fat, then you're saying that God or nature, however you want to phrase it, got it wrong in terms of designing human breast milk. It's good for the body. It's critically important for the brain.

Why saturated fat is such a plus is because, by definition being saturated, it is resistant to being oxidized. And beyond that, we know that a diet that is higher in fat, especially when the sugar and carbohydrates are restricted, does tend to create what you had mentioned earlier. And that is these ketone bodies, allowing people to get into a state of ketosis, meaning that their bodies now are moving away from burning glucose or sugar as a fuel source in favor of burning a special type of fat that we call ketones, which turns out to be, for humans, an absolute super fuel.

Dr. Menolascino: And that whole ketogenic movement, it's interesting how one idea gets so much steam. You're talking about the saturated fat in breast milk. And there are some studies showing how the toxicity of the mother gets transferred to the child through the breast milk carried by this saturated fat.

You mentioned the glyphosate and whether it's an organic GMO-raised food versus non organic, non GMO. Where do you see that as being where you can hedge your bets? Can we have none of it with this stuff with the glyphosate? Where do you make that line? Now, ideally, everyone would like to be all organic, all pure, and never do it. But where can you hedge your bets with the different [inaudible]?

Dr. Perlmutter: Great question. I think what you're asking—

Dr. Menolascino: I'm on sure.

Dr. Perlmutter: Here we are in 2019. How do you live your life? I think you do the best you can in all of your lifestyle choices, whether it's exercise, sleep, diet, your relationships. These are all choices that you make. And you've got to do the best you can.

The deck is clearly stacked against us in terms of having availability to do 100%.

Dr. Menolascino: And maybe more so for women because of the hormonal sensitivities, an epidemic of thyroid disease/Hashimoto's thyroiditis. It's even harder, I think, for women.

Dr. Perlmutter: I think that's right. And I think as you have and as we have today called attention to the fact that the cardiovascular disease is such a huge issue, under recognized in women. Hey, guess what? Alzheimer's is 2:1 a woman's disease. So there are a lot of factors that are in involved in that.

And let me take that to a place of explanation beyond the simple idea that women stop menstruating and their hormone levels change. But let's take it to an earlier situation, earlier in life. And that is, to understand that PCOS (polycystic ovarian syndrome) is now affecting up to 20% of women in western cultures. What does it mean? It means that they develop insulin resistance.

But importantly in my field, PCOS is associated in women with a 9 to 14% reduction in brain metabolism of sugar which is comparable to what we might see on a brain scan that measures this of a 70 year old. And these are women in their 20s and 30s. And it's epidemic.

So I think that diet is key here. I think we have to, again, focus on the notion of powering the brain with fat, powering the heart with fat, and beyond that understand that when women are in a state of ketosis and creating good ketone chemicals like one called beta hydroxybutyrate. Beyond just serving as a fuel, getting back to our discussion of the mitochondria, this is a powerfully anti-inflammatory approach and, beyond that, reestablishes this forgotten sensitivity of the insulin receptor.

So it sounded bad before. You had your inflammation, your problems with the insulin receptor damaging the mitochondria which led to more inflammation. You're thinking, "Gee. We're in deep trouble." And you are. But you can jump off the carousel. And you can jump off that carousel by targeting your mitochondria, by targeting your insulin receptor, and by targeting inflammation.

And you do that by getting on a diet that will create these chemicals in your body called ketones which really emulate the type of metabolism that humans had for a couple of million years and that we've suddenly come away from just in the past couple of centuries.

Dr. Menolascino: And David, do you see some of your clients that do the ketosis and do the ketogenic diet and actually don't do well? And what's unique about those people or their metabolism or their genetics, the way that they just don't process it because some people do really well for a while and then crash. And they think they're doing everything right. And it actually sabotages them.

Dr. Perlmutter: It's a great question, Mark. (Get it? Question mark. I didn't realize it would sound like—)

Dr. Menolascino: I've heard that.

Dr. Perlmutter: It raises a question mark, doesn't it?

And I think that there are very, very few number of men and women who ultimately can't do great on a ketogenic diet. But do some people have problems? They do. But they're work throughs.

I would rank probably on top of the list of issues people get into going on a ketogenic diet, constipation. And the reason that happens is very straightforward and so easy to work around. What happens is people think that, "Oh, I'm going to go low carb and get on a ketogenic diet. And I'm going to be great." And you have to understand what it means. Low carb doesn't mean getting rid of your fiber. And that becomes a huge issue.

So when you stop eating complex carbohydrates in the form of fiber, you're going to have problems. You're going to have problems in terms of nutrition and also certainly physical problems by not having adequate fiber in your gut. And perhaps most importantly, you're not going to nurture your gut bacteria which are really going to be hugely helpful for you on a ketogenic diet.

The other issue we see is that you've got to pay attention to adequate amounts of things like potassium, magnesium, and sodium. So in other words, minerals become really key on a ketogenic diet. So you've got to be cognizant of that, welcoming some salt back to the table. And understand that not everybody keto-adapts or feels great on a ketogenic diet the next day. It may take a couple of weeks. And you have to understand that and be willing to give it a try.

I would say that the number of people whom I've encountered who have a genetic issue that doesn't allow them to do well on a ketogenic diet is extremely, extremely small. So I think that you need to work with a healthcare

provider. You need to read various books that are out there. Understand that fiber is critical.

You can be on a ketogenic diet and be vegetarian. There's a wonderful book called *Ketotarian* by Will Cole. It talks about that. I had the opportunity to interview him recently. So the idea of being on a ketogenic diet is not incongruous with being on a vegetarian diet.

Dr. Menolascino: So true.

Dr. Perlmutter: So people think that being on a ketogenic diet is Atkins Diet Redux. It is not. You're not sitting around eating pork rinds all day and hoping that you get into ketosis. It's a diet that you can do vegetarian.

Dr. Menolascino: Well, you mentioned a lot of these different foods. And we're lucky here in Jackson Hole. We have this vertical harvest where they took the side of a parking garage and turned it into a greenhouse. And it's all organic. It's one of the best veggies that comes out of our community. And those tomatoes taste different than even the organic tomatoes that I buy at our Whole Foods store here.

And the eggs that you can get—my neighbor raises [chickens] with omega-fed, hand-raised. And the yolks are this bright orange. Whereas when I went out for breakfast with some friends, they were pale yellow. So an egg is not an egg. A tomato is not a tomato. And grain is not—

Dr. Perlmutter: And meat is not meat.

Dr. Menolascino: And meat is not meat. And grain is not grain. Can we come back to the grain for a minute because you're such the world's expert? There's so much confusion about—is it GMO'd? Is it hybridized? What's so different about the amber waves of grain I ran through as a kid versus the shin high what that I see growing in Idaho? What happened, David? What happened to that?

Dr. Perlmutter: There's a lot of answer here.

Dr. Menolascino: I know.

Dr. Perlmutter: Basically, what really happened was the predominance that grain and grain-based foods have taken in terms of a calorie source in the human diet. That's the big issue here. And now, 40% of the foods we consume

are derived from wheat. And beyond wheat being sprayed with glyphosate and the gliadin issue which I think is actually very important, the biggest issue by far and away is that when we have a grain-based diet, we have a carb-based diet. End of story. So that's the huge issue.

When agriculture was developed 10, 14,000 years ago—the date keeps getting pushed back—it really shifted for the first time for humans the diet away from a diet that was one of basically what you could find or kill, i.e. protein, some plants of course, (fiber-rich plants lower in simple carbs), and fat as mentioned, fat being a really wonderful source of calories to grains which were portable, storable, allowed us to move around, allowed us to harvest and then have a source of "food" (I'll put it in quotes) over a period of time and extend our period of calorie availability.

And that, as mentioned earlier, targeted our genome. Our genome is one that responds to these cues dramatically. And one of the important cues that our genome responds to is cues that let us know what season of the year it is. By that I mean that we now understand that the expression of our genome changes according to environmental experiences. When we mimic what our ancestors would experience in fall, our genome changes.

In the fall in the past when we were in our hunter-gatherer days, sugar in the form of a ripened blueberry, for example, would tell us that winter is coming. How so? It would change our microbiome, first of all, and allow our blood sugars to increase. But also, sugar is found in natural foods like fruit which tend to ripen in the late summer, early fall. Meaning that here we are tied into the seasons of the year. And we're suddenly getting sugar in the diet. It tells our bodies to make insulin to deal with the sugar.

And insulin is far more important than simply lowering your blood sugar. Insulin tells your body, "Winter is coming," meaning make and store fat. And now, we are targeting that genetic mechanism year round. And that began with the adoption of a diet based upon agriculture, i.e. based upon grain like we led into this conversation with.

So what has changed then since the advent of agriculture is this powerful signal that we're sending to our genome that winter is coming.

Dr. Menolascino: That's great.

Dr. Perlmutter: Now, we're telling our genome winter is coming 365 days a year as we bombard our DNA with this sugar signal and therefore stimulate

the genetic pathways to make inflammation, stimulate insulin to tell our bodies that we need to make and store fat.

So that is the cornerstone of why this adoption of a grain-based diet is really responsible, I think globally, for our declining health.

Dr. Menolascino: I love that.

Dr. Perlmutter: Certainly, spraying with glyphosate is a problem. Certainly, gliadin and its effects on the health and integrity of the gut lining is an issue. But the overriding issue here with respect to grain entering the human diet is the carbohydrate story.

Now, does it mean that you can't eat grains? By all means, it does not mean that. Can you have a portion of an organic corn or rice? Absolutely. But to center the diet on bread and pastries and pasta and other forms of grain-derived, high carbohydrate foods is a huge mistake.

Dr. Menolascino: I grew up with irritable bowel syndrome. And it wasn't until I realized that it was really dairy and egg for me. But I've never tested positive on all the food sensitivity-type tests to gluten. And I didn't realize it was a problem until I went to Europe and spent three weeks in Italy, eating Italian bread. My stomach was flat. I felt great. My energy was good. My sleep was good. The first day back, I had a bagel. And my stomach bloated.

And I hear a lot of my clients say, "The bread here is just different than what I eat when I go to Europe or I go to other countries." Is it truly that different?

Dr. Perlmutter: It is different to some degree. One of the main things that we see here and why various areas of Europe will not import American wheat may well have to do with the fact that, by and large, wheat in America is sprayed with glyphosate and herbicide.

Now, if you know anything about wheat in America, you might wonder why we do that because the wheat here is not GMO. And generally we think of glyphosate in relation to GMO because the reason the seeds for corn and soy are modified is to make them glyphosate resistant. So the farmer can spray the crops with this herbicide. And the actual crop doesn't die. But the weeds will.

Well, the wheat used here in America is not GMO. It's not a special type of seed to be resistant to glyphosate. So having said that, in the wisdom of

marketing, farmers were convinced that if they spray their crops with this poison they will then be able to dry it out more quickly and bring it to market and therefore attain a higher level of profitability.

So that practice of spraying the food that you will eat here in America with poison has now become very, very widespread. The World Health Organization characterizes glyphosate as a probable human carcinogen. A cancer-causing agent being sprayed on the very food that we eat, being sprayed on the wheat that went into the bagel that you then ate and didn't feel well thereafter. So I would say that is certainly a huge difference between a bagel here and a croissant in France.

But I do want to make it clear that we tend to think that, "Well, I didn't eat bread today. I had a bagel. Or I had a croissant. Or I had toast." Call it what you will. But it's bread. A rose by any other name is still a powerful source of carbs.

Dr. Menolascino: Isn't a serving of bread essentially a handful of sugar the way your body processes it?

Dr. Perlmutter: What that does to your glycemic load is very high. The glycemic index of whole grain bread is higher than a Snickers bar for that matter.

Dr. Menolascino: I think that shocks a lot of people to hear. They don't expect that.

Dr. Perlmutter: I would say at the end of the day, even at the beginning of the day, that we really, aside from our discussions about glyphosate and about gluten and gliadin, etc., I think the big issue here that needs to be confronted is what is bread doing to your blood sugar and therefore your insulin receptor. And how is it paving the way for you to become insulin resistant which opens the door to diabetes which increases a woman's risk for cardiovascular disease by three to fourfold, as we've talked about.

That's the relationship that needs to be vetted and really revealed in terms of this huge epidemic of cardiovascular disease in women, I believe relating to not just women but all downstream consequences of becoming diabetes which is a huge problem here in America. Diabetes and prediabetes affect as many as 80 million Americans. And what does that mean? It means that we are—

Dr. Menolascino: Falling apart.

Dr. Perlmutter: Paving the way for these individuals to have these chronic, degenerative conditions. And it's got to stop.

Dr. Menolascino: And I've heard others talk about dementia and Alzheimer's as type 3 diabetes. And so really, a lot of people come in to see me with a normal blood sugar on a fasting blood test. But when we check their insulin or challenge them with an insulin challenge, it spikes. And these tend to be people who might be skinny fat, who have no fat on the outside. But they're laying down that internal, visceral fat. How do you explain that concept of type 3 diabetes? And do you feel like it's a valid concept, tying it to the brain and the heart?

Dr. Perlmutter: Well, I think it's a bit of an unfortunate moniker for Alzheimer's disease being type 3 diabetes because type 1 and type 2 are characterized by elevated blood sugar. You can have Alzheimer's and have a so-called normal blood sugar, though what we define as normal, I think needs to be reevaluated. I'd rather know what's optimal in terms of blood sugar.

But that said, I think we're now fully understanding that glucose utilization is a powerful harbinger for Alzheimer's, that the brain's ability to use glucose as a fuel source may be predictive of Alzheimer's 20 years in advance.

That said, the idea that when you do these brain scans that show glucose utilization in the brain being defective in people with pre-Alzheimer's (or mild cognitive impairment), you might think that, "Oh, these areas that we see on the brain scan that are demonstrating poor glucose utilization, the reason that's happening is because these brain cells, these neurons are dying. And therefore, they're not using blood sugar." That is completely flawed.

How do we know that? We know that because now, in addition to brain scans that show glucose utilization, we have brain scans that show ketone utilization, that image, what's called [11C]acetoacetate (or a ketone that's radiolabeled). So we are able to see brain metabolism when ketones are administered to an individual. And the very areas that were not functioning when glucose was the fuel source actually are functioning quite well, thank you very much, in these individuals once they are delivered ketones.

So what does it tell us? This is a very important message. It tells us that this metabolic defect that so characterizes the early Alzheimer's brain is reversible! And does that mean that early Alzheimer's is reversible? Well, we've seen that now in the work of Dr. Dale Bredesen, the reversal of Alzheimer's, a disease for which there is zero medical treatment available on the planet. There is no

pharmaceutical treatment for Alzheimer's. And yet, what Dr. Bredesen has done is not just resupply the brain with fuel but improve a variety of parameters that relate to downfall or dysfunction of the brain in the Alzheimer's patient, normalizing homocysteine, vitamin D levels; looking at hormones; reducing toxins; improving brain fuel availability; getting people to exercise to increase their production of a brain hormone that allows regrowth of brain cells. We call that BDNF.

Dr. Menolascino: So you really do have to take a whole-person approach.

Dr. Perlmutter: You bet. The idea that we're going to prevent a woman's cardiovascular disease by giving you a statin drug—we talked about earlier. How narrow minded is that? What we need to be talking about is focusing on reestablishing normal blood sugar and insulin sensitivity. And that's a home run.

Dr. Menolascino: For that individual. How do we do it for that individual?

Dr. Perlmutter: You're exactly right. And I think that opens the door to weight loss, to reducing this body fat that is pro-inflammatory, to reestablishing sensitivity of the insulin receptor, to reestablishing better blood lipids, to lowering blood sugar, to increasing the production of this chemical called beta hydroxybutyrate, a ketone. So that's the ticket.

Dr. Menolascino: And that's the power of lifestyle medicine.

Dr. Perlmutter: There's no magic pill for this.

Dr. Menolascino: It's not a pill for the ill like we were taught in medical school.

Dr. Perlmutter: No, to this day, people think, "Well, there's a pill for my heart. There's a pill for my brain and a pill for my diabetes." And what happens? They end up taking 11 or 12 different medications a day for blood pressure, diabetes, high lipids or cholesterol, maybe something for weight loss, maybe something to keep their brain working. What a mess! Because, "Above all, do no harm." And as I mentioned earlier, just the idea that statin medications increase risk for diabetes around 40% for men and around 71% in women, we have to talk about that stuff because it's hugely important!

Dr. Menolascino: Well, I think the average woman over 65 takes six medications. That's the current American average.

Dr. Perlmutter: And by and large, most of that is going to be statin drugs, antidepressants.

Dr. Menolascino: Blood pressure pills, antidepressants.

Dr. Perlmutter: [inaudible 44:47] diabetes.

Dr. Menolascino: Heartburn meds, diabetes meds. They are the cure and the pill for the ill. We've had Dean Ornish talk about reversing heart disease, a lifestyle program to reverse heart disease. We've seen functional medicine doctors reverse type 2 diabetes using lifestyle medicine. And you're talking about the work of Dale Bredesen, a lifestyle program to reverse Alzheimer's disease. Is there really any chronic illness that we can't address through lifestyle?

Dr. Perlmutter: I don't believe so. And I think the most compelling work was done by Dr. Sarah Hallberg at Virta Health, looking at her one-year intervention in type 2 diabetics. Half the group continued to see their doctors and get standard medical care, medication, etc. And the other half were placed on a ketogenic diet, a diet that lowered that sugar and carbs and increased their ketones.

And the results were dramatic! She basically reversed diabetes in many of these individuals. One of the drugs that is commonly used in diabetes is called sulfonylureas. And in the group of patients, interventional group who were taking sulfonylureas for their diabetes, the percentage of those people who stopped those drugs was all, 100%.

I interviewed her. When she told me that, my jaw dropped. It's absolutely breathtaking!

So during the course of one year, the people on the interventional group going on the ketogenic diet actually overall reduced their medication. And the group that took standard of care actually had an increase in the number and amount of medications that they were taking.

So here she proved it in a fairly respectable cohort of individuals, that you can do this with lifestyle. And the results are going in the right direction, not the wrong direction.

Dr. Menolascino: Well, that's interesting because we're taught that we start with one drug for diabetes. Once that wears out, we add a second one. Once that wears out, we add a third one.

Dr. Perlmutter: And then you add insulin.

Dr. Menolascino: And when they all wear out, then you add insulin. And it's such a predictable path. And that path can be stopped and reversed.

Dr. Perlmutter: Needs to be stopped. That's the key to lowering cardiovascular issues in women. I believe it relates to, obviously, diabetes, but also to Alzheimer's disease and its relationship to elevated blood sugar and insulin and, I believe, cancer as well.

Dr. Menolascino: I think the biggest risk for cancer is body fat, next to exposure.

Dr. Perlmutter: It's body fat. It's also elevated blood sugar. Time and time again, the literature would confirm what you just said. Cancer loves sugar. There was a study that was published a couple of weeks ago.

Dr. Menolascino: What a great point.

Dr. Perlmutter: It demonstrated, I think it was non Hodgkin lymphoma cells actually change the gut bacteria in such a way as to allow the blood sugar to elevate because they love it. "And we're going to make changes in the neighborhood that suit us." So cancer cells increase blood sugar because they like sugar.

Dr. Menolascino: And the bacteria in your gut will determine how you extract the sugar from certain foods.

Dr. Perlmutter: Oh, that's right.

Dr. Menolascino: Coming back to your microbiome.

Dr. Perlmutter: That's correct. So a very powerful event goes on there in terms of amplifying inflammation and making, as you mentioned, the blood sugar higher.

Dr. Menolascino: I loved your metaphor or talking about the seasons, how in the past we used those seasons for different sugar contents to cue the body

and to cue the genes. Our friend, Jeff Bland talked at the International Congress about clock genes. So there's a moment-to-moment clock inside our genetic code. There's a monthly clock inside a woman's body. And there's a seasonal clock that we have lost over time. It's fascinating to me how all of these interactions portray with the environment. And once those cues are gone, we start following down this slippery slope.

Dr. Perlmutter: What you're saying is really critically important. I spoke with Dr. Bland about that yesterday.

Dr. Menolascino: Great.

Dr. Perlmutter: And about the notion of chrono-biology. Again, it's an environmental relationship that we have lost, the day-to-day sunrise/sunset; the seasonality and its affects upon our bodies. And as we distance ourselves from that, we are distancing ourselves from a powerful signaling mechanism that allows us to stay in sync with things around us. And we see devastating things are happening in response to that.

Even just day to day not getting enough sleep at night, having blue light exposure at nighttime from our tablets, our phones, or TV monitors, etc. really does change our physiology significantly by its effects upon melatonin, upon immunity, upon the quality of sleep that we get.

Sleep is not a passive thing. It's not like everything turns off during sleep. Some very important pathways are activated during restorative sleep that we need to pay attention to. The brain cleans itself up. We have activation of the glymphatic system to help the brain rid itself of debris and consolidate memory. And now we see how very important restorative sleep is in terms of insulin sensitivity. And that relates problems with sleep to inflammation to changes in the mitochondria to getting back on that carousel, doesn't it?

Dr. Menolascino: Well, you talk about sleep and this routine and this pattern. And there's probably one thing in lifestyle medicine that's most elusive to our clients; it is sleep. As a neurologist, you know all of the things you can give medication-wise for sleep. What are some of the pearls that you have to share with our viewers about getting good sleep? You mentioned blue light. Are there other things that they can do, David?

Dr. Perlmutter: Of course. And I would say that the notion in our society is that if you don't find that you're sleeping well—you may see the commercials of people up looking at their clock at 2 o'clock in the morning—

Dr. Menolascino: With the butterflies.

Dr. Perlmutter: These will take whatever it is. And you've got to understand that the sleep that you will get by taking a drug is not doing the job. Sure, you went to sleep. And then you woke up at whatever time you set your alarm, which we'll talk about in a moment. And you feel, "Gosh! I got eight hours of sleep. I'm going to take that drug again tonight." The reality is that's not getting you to the type of sleep that you really need, the depths of sleep, the restorative type of sleep that you need.

And it is really very, very important. Sleep is as important for human health as the diet that we consume, which is obviously fundamentally important, and not talked about.

So there are a lot of things to consider. I think we need to think about winding down in the evening. The TV shouldn't be on. The time to look at your iPhone and your computer screen is not at night. If the sun goes down, those things go off.

Dr. Menolascino: Great. Great.

Dr. Perlmutter: Because as you're bombarding your body with blue light and light in general, you are compromising your body's ability to make the sleep hormone melatonin. And therefore, the quality of your sleep is going to be reduced. You need to settle in in the evening. You should be eating your dinner several hours before you plan to go to sleep. You should certainly be watching the foods that you consume. You shouldn't be having foods that are rich in caffeine or other things that may bother you as an individual like tyramine, cheese for example, other tyramine-rich foods.

So I think it's really important to get a handle on this. Make sure you're getting exercise each day. This notion of going out and having a great dinner and drinking some wine, another thing that compromises sleep—though you are asleep, when you've had wine in the evening, that quality is not as good as it would be had you not consumed alcohol.

There are a lot of factors that we talk about. I put this on my website for people to read. I've written about it in books. And it's really very, very important, especially—well, maybe not especially. But one thing we should consider is younger people. These kids are up doing their homework, on their iPhones and the computer to get their work done. And then we wake them up

at 6 o'clock to catch the bus or give them their breakfast and push them out the door. Well, that breakfast is high carbohydrate.

What do you expect? The kids aren't sleeping well. And they're hounded with high sugar foods in the morning. By 10 o'clock in the morning, they can't concentrate, can't focus. And they get a diagnosis. And the next thing you know, they're on a stimulant drug for ADHD.

Let kids sleep. Maybe we should start our school hours a little bit later and let kids start their day with a breakfast that makes more sense, that provides them good fat and protein for their brains and isn't a powerful carbohydrate/sugar surge that makes them have high blood sugar, high insulin. And then insulin crashes their blood sugar. And by midmorning, these poor kids are in trouble through no fault of their own. And we've got to realize we're tinkering with their brain energetics. No wonder they're having such troubles!

Dr. Menolascino: It's interesting. Two years ago in our community, Jackson Hole, we moved the school start time back. And we all realized it was just too early for our kids. And with the short days in the winter with the high elevation, it really made a big difference, that extra 45 minutes was a real benefit for the kids.

Dr. Perlmutter: I think you see better school performance. You see fewer car accidents.

Dr. Menolascino: Yes, accidents.

Dr. Perlmutter: So I think there are many things that, in studies that have been done in places that have changed their school start hour to a little bit later, are really beneficial.

Dr. Menolascino: It makes sense.

Dr. Perlmutter: You think, "Well, the kids will just stay up later." In actuality, they don't. They know they're up late when it's 9 or 10 o'clock and, I'm sure, later for others. But that tends to remain static. So if you push later their time to get to school, they'll get a little bit more restorative sleep. And they'll perform a lot better. And then feed them right.

Dr. Menolascino: That's the key. And we should do that to ourselves, too.

Dr. Perlmutter: Who knew?

Dr. Menolascino: David, you're a teacher of teachers. You're a teacher of doctors. You're knowledgeable. And the way you communicate all of these great ideas, I just love it.

If our viewers wanted to connect with you, learn more about the work you're doing, how do they find you?

Dr. Perlmutter: Well, oddly enough, my website is DrPerlmutter.com. The book *Grain Brain* that you mentioned was just revised and just published.

Dr. Menolascino: Great.

Dr. Perlmutter: So that's now out. The *Grain Brain* five-year revision. I have Facebook which is David Perlmutter, M.D. But I think the best place to find me is, I think, on the website. And that's where people can get our newsletter which goes out every week and is completely free. And my mission is just to get this information out and hope that people are going to listen to it and maybe act on it. That would be the dream.

Dr. Menolascino: Well, *Grain Brain* is one of my personal favorite books. I've given away at least 100 to my clients.

Dr. Perlmutter: Well, I appreciate that.

Dr. Menolascino: What's your next project? You've done so much to move the needle for health worldwide. What's your next project, David? Where are you putting your energy?

Dr. Perlmutter: Well, as you did mention in the intro, later on this year we'll be publishing a book called *The Microbiome and the Brain*. We have leaders from around the world who have studied this relationship between what goes on in the gut in terms of bacteria and other organisms and how that influences the brain. We have authors from MIT and Harvard and UCLA an Oxford, so really top people talking about this relatively new science.

In January of 2020, our new book comes out. I'm writing that with an Austin Perlmutter, M.D. and David Perlmutter, M.D. (that's me). That's our son.

Dr. Menolascino: Great.

Dr. Perlmutter: And this book is called *Brain Wash*. And it is about how we distance ourselves from the negative influences that are so pervasive in modern society—the things that we see in social media, the negative effects of the modern western diet upon the brain, our lack of sleep, our lack of exercise. And how we can reconnect to the good parts of our brain and distance ourselves from the fear parts and the egocentric parts of the brain.

So I'm really very, very excited about that. Austin and I are having just an amazing time bonding and writing right now.

Dr. Menolascino: Congratulations! Fantastic.

Dr. Perlmutter: And it's all about reconnecting to your gut; reconnecting to your neighbor; reconnecting to your neighborhood, your community; and reconnecting to the planet. So that's what's in the hopper right now. And it's a very exciting project.

Dr. Menolascino: Well, I love your passion, David. Keeping pushing on. And I thank you so very much for joining us today.

Dr. Perlmutter: I'm delighted to be here, Mark. Thank you for having me.