Why a Neurologist Shifted Focus to Gut Microbes and Metabolic Function as Solutions for Brain and Mood Issues Transcript

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Introduction to Microbes and Mental Health

This is doctor talks. Real talk from real doctors. Only issues that matter to you most. everyone, and welcome to the Microbes and Mental Health Summit.

I'm your host, Doctor Miles Nichols. Together here today with Doctor Perlmutter. Doctor Perlmutter is, board certified neurologist. He's a six time New York Times bestselling author and many people haven't heard of.

And, his books, his presence, his communications, lectures, interviews you really are an amazing educational aspect to your website, with blogs for the community to help people to understand a little bit more about brain function and how brain function connects with things like diet and lifestyle and gut dysfunction.

So we're going to dive today into those connections, brain mental health connections with some of the underlying diet, lifestyle and environmental variables that people can impact.

Welcome, doctor Perlmutter, thank you so much for being here. Thank you, Doctor Nichols. Looking forward to our time together. How do you become deeply invested in working on, side of medicine?

It's not common for neurologists to be involved with. What you said is very true. I mean, to think that, a neurologist would be interested in what's going on in the gut.

Back when I started exploring that, was certainly challenging for, for my, other comrades, in neurology, that's for sure. The brain existed in and of itself and was not influenced by anything else going on in the body.

And fortunately, I think the science has has really changed that perspective. Pretty, diametrically to the point that we recognize the brain is intimately influenced by various, areas of the body, various, organ systems in the body directly and moment to moment in terms of not just how the brain is functioning right now and how it's, processing information, utilizing information, but also in terms of its health and therefore, as it relates to the brain's destiny, whether you're going to be fully functional from a cognitive perspective.

Ten, 20, 30 years from now, however old you may be, or not. And, the really empowering part of that discussion is that it's really centered upon our lifestyle choices, the amount of exercise we get or not, the amount the quality of our sleep, the amount of sleep that we get.

Certainly our food choices, the drugs that we choose to take or not.

Lifestyle, Brain Health, and Alzheimeru2019s Prevention

Right. So, I mean, pharmaceutical medications, the relationships we have, the amount of stress that we engage, the amount of time in nature. All of these are variables over which we have control that affect the brain in ways far beyond any concept of a pharmaceutical.

You know, we're we're kind of led to believe that we should live our lives however we choose. Then when we suddenly develop a problem or as is more typical, a series of problems, that there are drugs to fix those problems.

Well, the reality is we don't have an Alzheimer's pill. The most popular pill that is prescribed for Alzheimer's patient is called donepezil or aricept.

That's used by about one third of the 6 million Alzheimer's patients here in America. And as published in the Journal of the American Medical Association by Doctor Richard Kennedy.

Not only does this type of drug called cholinesterase inhibitor not work, it actually speeds the cognitive decline of individuals who are taking it. It would be like giving a blood pressure patient a pill that would actually raise their blood pressure, or treating somebody with high cholesterol, with a drug that would raise their cholesterol.

So it's making people worse. And yet, you know, it's still advertised in my neurology journals is this is how we should treat Alzheimer's. It doesn't work. So getting back to your question, we recognize that, you know, our lifestyle choices are hugely influential as it relates to the moment, to moment functionality of the brain as well as its destiny.

That whole notion I found to be very, very attractive because, as a mainstream practicing neurology, I wasn't treating diseases, I was treating symptoms.

And more importantly, there was no way I was involved in prevention, preventing neurodegenerative conditions. What a notion. Now we are able to speak about that because there's vast amounts of literature that indicate, as mentioned, that lifestyle choices, for example, a mediterranean diet.

We'll talk about diet, for example, a diet that's low in refined carbohydrates, how these are related, for, to reduce risk of Alzheimer's, a disease for which there is no treatment.

Now, I found that years ago to be far more attractive, then simply giving drugs that didn't work. You know, I think as I present that now to you in such stark terms, you could see what it was that tipped me over to the other side and began and why I began researching these issues and writing about them and talking about them because they're so important.

You know, we talk about the 6 million Alzheimer's patients in America, with that number going to triple by the year 2050. But it's really the the single Alzheimer's patient that affects that family and that individual's loved ones.

That really is so motivating for people in my position to do more in terms of outreach, to give people this message that we're talking about right now.

And, you know, the reality is I lost my own father to Alzheimer's. So when people are explaining to me, what it's like to have a relative, a loved one, go through that and how they feel and what their experiences are, I've been there, and it, it strengthens your resolve to stay focused on this message and continue doing what I'm doing, moving forward.

That's a great point. And as medicine has evolved over the past 100 years, it used to be that the big killers were things like typhoid and tuberculosis.

These infections pneumonia. And as medications have evolved to be able to take care of these acute issues, today, the disease is outside of accidents and, and, and certain significant issues that are fairly uncommon that the top killers are chronic diseases.

And these chronic diseases tend to be things three big categories. And these categories tend to be cardiometabolic diseases that manifest as heart disease and results that kill people.

And then sometimes it's the neurological diseases that end up being cognitive decline, Alzheimer's, dementia. And then it's the cancers. And these tend to be the three big things that as people are aging, start to become bigger and bigger issues.

And I think everyone wants to think that they can maintain their brain function as they age. They can, even if they don't have a family history of Alzheimer's or dementia.

There may be a mental health concern, there may be depression, there may be anxiety, there may be some slight memory issue or some changes in their neurologic function that they're concerned about.

I'm curious why is now an important time to take seriously the causes and solutions for mood problems and brain imbalances?

Diet, Sugar, and Metabolic Disease

Let me answer that question in just a minute, because I want to, win the tape back just a moment to what you just said, and that is that, you know, this delineation into these categories of cardiometabolic disease, neurodegenerative conditions in some form of cancer.

And to be fair, by and large, they're they're all one in the same that, you know, we for whatever reason, we hang on to this term cardio metabolic disease, because we know that disturbances of our body's metabolism can manifest as heart disease.

Well, disturbances of our body's metabolism can manifest as something called Alzheimer's as well. And really, any of the chronic degenerative conditions is at its core, a metabolic issue.

And the World Health Organization tells us that the number one cause of death on planet Earth are the chronic degenerative conditions. As you well characterize, we're no longer dying from infectious diseases, and it's not Covid that is the number one cause of death on our planet.

It is the chronic degenerative conditions, the Alzheimer's cognitive decline, the cardiovascular issues, various forms of cancer, obesity, type two diabetes, etc.

these characterized diseases that are lifestyle related. Importantly for your viewers and that represent the number one cause of death on our planet and whose numbers are absolutely exploding as dietary changes, shift from being a standard American diet to the so-called Western diet to now being the global diet here in America, 58% of the average Americans calories each day come from what are called ultra processed foods.

And that is a shotgun for metabolic disturbance, raising blood sugar, increasing insulin resistance, and leading to all the downstream consequences of this metabolic disturbance, which are hypertension, weight gain, type two diabetes are mentioned, etc.

so it really begins at a place of understanding what we are eating. And even upstream of that, what we are being told to eat. You know, when the Dietary Guidelines for America, which were given every five years, were last put out, we were told that it's perfectly reasonable if you want to be healthy, to have up to 10% of your daily calories come from sugar.

So what does that mean? It means if you're talking about 3500 calorie, low calorie diet a day, that means 350 calories derived from sugar. That is scary that our government would tell us that.

And beyond that, that that would be the, the, instituted at governmental, agencies or governmental institutions like the military, like the VA, like school lunch programs that are funded by the government, 10% coming from sugar, which we know is central to causing these metabolic disturbances, including senile dementia of the Alzheimer's type.

Oddly, when we talk about sugar, general, we talk about sucrose. And, sucrose is, an amalgamation, if you will, of two types of sugar fructose and glucose.

The brain actually requires glucose to some degree to function. But it's the fructose which comes from fruit, but now from high fructose corn sirup, hence the name that signals the body to prepare for winter, to make fat, to store fat, to become insulin resistant, and even changes the brain, to increase foraging and to be more risk taking.

And this is the type of sugar that we are enhancing in the American, the Western and the global diet. Now, that's actually, changing our brains and setting the stage for Alzheimer's.

We had a paper that came out, two weeks ago in the American Journal of Clinical Nutrition, actually focused on this exact topic. So, again, you know, I find this to be fascinating because it starts to answer some very important why questions.

Why is this happening? Why, when we look around, well, by 2030, which is right around the corner, 50% of American adults will be not just overweight, but clinically obese based on on body mass index.

This is devastating. I mean, it gets back to your original, you know, discussion that, again, what's killing us are these metabolic issues and the downstream cod, degenerative conditions that we are seeing, that are so pervasive.

And the empowering part of the discussion is that we can make changes. We can, you know, give out information, which is the mission of my life that can allow people to make changes hard though they may be, to bring about better health and increased longevity.

And that's so important because people want health and longevity and quality of life, of course, is important too. And brain function plays a role in how people are able to even enjoy their day to day experience of life.

And I want to ask, to what extent do you feel that the the mental health disorders, the challenges and struggles with mood relate to brain dysfunction?

I know Alzheimer's, dementia, you're you're you're so well versed in talking so much about those issues. How much do you think that these same diet and lifestyle factors and these microbial changes in the gut and, and in our environment are connected also with mental health issues?

And and where do you see that fitting into this discussion? Well, I think there's a very strong and vast connection between both alterations of the gut.

Flora and cognitive decline and Alzheimer's disease, as well as mood disorders. And, you know, and I think as it relates latter there, you know, 350 million people in the world right now that are suffering from major depression.

And it it's it's a life threatening condition. It's a huge, cause of disability, probably the number one cause of disability on the planet and doesn't because it's, you know, you're you're depressed and it's a mood disorder.

It's not talked about. And I think those numbers are increasing quite dramatically. We saw a huge bump, during and after Covid, as a consequence, not just of the viral infection, but as a consequence of the disruption of people's lives that has, transpired based upon all that we experienced.

But I think that fundamentally, there's actually quite a bit of overlap in terms of causality, and, and therefore opens the door for, approaches lifestyle approaches targeted at not only depression, but, but Alzheimer's, low cognitive decline. So both are really predicated on a mechanism which is inflammation.

Alzheimer's is a consequence of an inflammatory situation in the brain. And inflammation mechanistically seems to underlie depression as well. And there are multiple nuances of inflammation as relates to depression, which ultimately take us back to the gut.

And this seems like an awful lot of dots to connect. But let's go ahead and connect those dots. So we, we value our, our ten to the 18, microorganisms that live within the gut.

They do wonderful things for us. They create vitamins, they create neurotransmitters, they maintain the integrity of the gut lining. They create chemical signals and fuels for the body called short chain fatty acids, various things that they do that keep us alive or not.

For our gut bacteria, we would perish instantly.

Gut Health, Inflammation, and Mood Disorders

Or very quickly, and very importantly, the array of gut bacteria, especially as we consider the healthful properties of having diversity of our gut bacteria, work to modify immune functionality.

That's huge. The set point of our immunity is governed by the state of health of our gut bacteria. Who knew? Why is that interesting for me as a brain doctor?

My gosh, that's a long way away, isn't it? Because Alzheimer's is fundamentally related to inflammation, which is upregulated by changes in the gut bacteria.

Alzheimer's is an inflammatory disorder. I've said it before, I'll probably say it a few more times. Depression is hugely influenced by inflammation through a number of mechanisms that maybe given time, we can unpack. But when we see research that demonstrates that people who take, for example, various types of drugs like NSAIDs or acid blocking drugs have increased risk for developing Alzheimer's disease, we have to take notice and ask ourselves, well, what is that mechanism?

And I think that more and more we're seeing that things that affect the microbiota, can lead to inflammation and can lead to these downstream issues. We know, for example, that metabolic disturbances are very, frequently fingerprinted by looking at the array and functionality.

In other words, the metabolomic, signatures of the gut. What I'm seeing is that you can strongly relate changes in the gut bacteria to diabetes, type two diabetes, to the extent that one researcher actually, in I think Sweden has been performing, and the very aggressive technique to repopulate the gut bacteria with healthy bacteria, using a process called fecal microbial transplant.

It's as wonky as it sounds, taking fecal material from a non-diabetic and inserting it into the colon of a diabetic and seeing improvements in their diabetes.

That's a pretty strong argument in favor of the relationship between the state of health of the gut bacteria and the management of blood sugar insulin sensitivity, for example.

For me, the traction is that if you have type two diabetes, you have quadrupled your risk for Alzheimer's disease, and you've dramatically increase your risk for dementia.

But not only of that type, but depression as well. So again, these, studies demonstrate this, through multiple lenses. The relationship between the health of our gut bacteria and inflammation.

Now how does it happen? Well, there are multiple things as it relates to depression. We know that inflammation, modifies a certain pathway whereby the brain and body are able to make a certain chemical that tends to be antidepressant, and it's called serotonin.

Now, that's a bit of a generalization, but serotonin generally lets us feel good, lets us feel like everything's okay. And it turns out that serotonin is manufactured from an amino acid called tryptophan.

When there are higher levels of inflammation in the body, the production of serotonin from its precursor, tryptophan is compromised. And instead of swarming serotonin, we form something called kind of phrenic acid.

Now, that's not going to be on the quiz. The point is inflammation shuttles away. Our ability to make this really feel good chemical that our brains need for us to feel good, called serotonin.

That's what happens when we have inflammation in the body. Now how do we get inflammation in the body? Well, one important way is when the lining of the gut is compromised.

When we compromised the lining, then certain components that live in the gut get into the body and turn on inflammation. One classic example is a covering over certain bacteria called gram negative bacteria called lipopolysaccharide, whatever.

That's not on the quiz either. But this LPs, when there is trouble in the gut, makes its way across the gut lining and then amplifies inflammation in the body that directly affects the brain.

But it also directly affects the balance of brain chemicals such that we reduce the availability of serotonin, and that can set the stage for depression.

You know, one of the earliest drugs that was promoted to help depression was called Prozac. And Prozac is an SSRI. What does that mean? A selective serotonin reuptake inhibitor, meaning that it's designed to block the reuptake of serotonin.

There's more serotonin floating around. Your depression will be improved and you'll be happier. Camper. Well, there's a lot of other things that Prozac and, its descendants can do, but just I mention that because it really focuses on how mainstream science has really looked at the so-called balance of chemicals in the brain as it relates to various mood disorders.

But I think, you know, this is the so-called mono and mono jet manager and an Air Jake hypothesis that, amines, mono amines, like dopamine and serotonin, play a role, in your mood, norepinephrine, for example, we have drugs in increased or epinephrine in the brain now as well.

And I think that's interesting. But we know that there's a fairly large number of people who don't respond to these drugs. So think it's valuable then that we look elsewhere.

And, I think a lot of science is looking at the gut, at the balance of organisms in the gut. The, the, degree of diversity of the gut bacteria. And importantly, what are the products, that these bacteria are producing once we get our arms around that and realize how we are so dependent on how we see the world based upon the health of our gut bacteria, then we really, recognize that we've got to care for these bugs, very aggressively.

You know, it's been said that when a woman is pregnant, she has to be careful that because she's eating for one. Well, you know, we're all eating for 100 trillion when you think about the gut bacteria, and it matters a lot matters for them, that's for sure.

And, it matters for us as well. Yeah. And that's incredible because we have this mechanism of action where the gut lining issues can lead to these bacteria in the cell wall, the gram negative bacteria having this LPs, that can be an endotoxin that can create this inflammatory backbone that can lead to multiple mechanisms for how depression can occur and Alzheimer's can occur.

And pretty much all the, the, the, the chronic diseases of today, then we have other mechanisms that you're mentioning there, probably other constituents and compounds that are being made by these gut bacteria.

Peptidoglycan are one. And there's also this signaling mechanism from the vagus nerve where the gut seems to signal to the brain, telling the brain, giving the brain some information about what neurochemicals to produce.

And there's been some interesting research looking at adding the vagal nerve in in mice and seeing changes in the way that, that that communication happens with certain bacteria.

And so you mentioned that this bacterial dysbiosis or problematic bacterial balance can be sometimes even in diabetics, corrected to an extent by doing a fecal transplant.

If someone is struggling with it, let's say they've found themselves in a position of metabolic dysfunction. How do they know what might be overlooked?

Maybe they have diabetes, maybe they don't. Maybe their blood sugar looks normal. What are some commonly overlooked signs that someone might be dealing with beginning stages of metabolic dysfunction before their doctor might tell them?

Well, I would say that, probably the most likely, reason a person would have a metabolic issue would be to be an adult, in America. And I say is because 80% of adults in America have at least one component of the so-called metabolic syndrome, which certainly doesn't speak for, you know, for our overall health.

So it's exceedingly, exceedingly common. In the classic markers of so-called metabolic syndrome are things like hypertension, elevated body mass index, insulin resistance, or full blown type two diabetes, dyslipidemia, elevated triglycerides.

And I think that we're adding to that list now, the notion of elevated something called uric acid, uric acid, I think it hasn't been yet officially added to define metabolic syndrome, because I think the science on that is relatively new.

I mean, it was actually only first described as being more than just related to gout, just, in 1898, by Doctor Alexander Haig. The point being that matter of fact, it's been known about for a long time that uric acid is far more important than just kidney stones in gout, that it is not just, associated with various other metabolic issues, but is playing a causative role in mechanistic role in causing, elevated blood pressure in causing insulin resistance, in causing weight gain, because it is a signal, it's a signal to the body to prepare for winter, basically to prepare for the stress of food scarcity.

Metabolic Syndrome and Uric Acid

And it has proven to be a powerful survival signal for us, during times of famine, even back to our primate, times in, when we first developed the, mutations, the genetic mutations that raise uric acid, in our primate ancestors and allow them to survive such that when they would forage and find a little bit of fructose, some berries or some fruit of some sort, it would turn on these powerful cascades that would allow them to gain body fat.

And that allowed them to survive. It would allow them to make metabolic water, and it would allow them to raise their blood pressure to become more insulin resistant so that they could power their brains and avoid predation.

And starvation. So, you know, unfortunately, these days we're seeing what we call an evolutionary environmental mismatch, where we're targeting that pathway with the incredible amount of fructose we are consuming, five fold increase in the last century.

And turning this pathway on making us fat or making us more metabolically unsound. So, you know, there are a variety of things people can look at. By and large, I think it's fair to say that in in Western medicine, unless it's drug related, we pretty much practice reactive medicine, meaning you get a problem, we're going to react and do something to help you and you get a headache, give you a pill.

Your, your blood pressure goes up. We'll treat you with blood pressure medication. Understanding that blood pressure medication doesn't treat your high blood pressure, it lowers the blood pressure.

For now, stop the medication. And you still have high blood pressure. So it's not treating the problem. It's treating the smoke, but ignoring the fire.

But the point is that we practice, reactive medicine. We should be focusing on proactive medicine. We should be focusing on keeping keeping people healthy in the first place.

We know how to do it. It's not really remunerative for pharmaceutical companies, etc., that we keep people healthy because they're going to need less drugs, less medical expenditures.

And, you know, we're spending $283 billion a year in America just to treat type two diabetes. When these folks need a dietary change that you can't eat what you want, pop a couple of your pills and bring your A1.

See below seven and think that that's good treatment doesn't work that way. And again, we're told live your life of RV choose. We'll fix it. But we see where why that's falling short.

Thank you for providing the evolutionary context behind how your gas ad levels may once have served a functional survival, mechanistic aspect to where gaining weight would have been helpful going into winter, where having things like increased blood pressure would have been potentially helpful when facing starvation, facing, time where not a lot of food or calorie will be available.

And this is similar in trauma where people might, when they're traumatized when they're young, shut down emotionally as a protective mechanism because they have an abuser that lives with them.

They can't get out of the situation, but later they're an adult and they're not with anyone abusive anymore, but they're still numb and not feeling it.

And there needs to be this sense of, okay, they're there. We need to do some things in order to help, to feel again. It's safe now. Similarly, evolutionarily, there's the we see that the conventional medical model looks a lot at some of those metabolic syndrome things you mentioned, like elevated cholesterol, like hypertension.

Someone goes into the doctor, they're going to have their blood pressure checked. If it's elevated, doctor can say something. If the cholesterol levels are elevated, the triglyceride levels are elevated.

That's monitored routinely. And the doctor might say something. Uric acid levels there in body mass index might be some. A lot of people are aware that if their body mass index or if they're hip to waist ratio is is elevated, if they're gaining weight, that's a problem.

Many people, they might get your ACC acid tested, but if they don't have an A level high enough to indicate gout, if they don't have gout or kidney problems, they might never have that discussed with them.

And they the ranges in the lab work might not be appropriate for, adding this into a more comprehensive picture of metabolic syndrome. So if someone is wanting to understand more about their metabolic function and wanting to understand how to understand through measures, through markers, through labs, through other assessment tools, what might be the level of dysfunction?

How would they interpret a uric acid level, or begin to understand more about how to add that into the equation, beyond just the blood pressure, the cholesterol, and the blood sugar side of things?

We've been told that a uric acid level above seven milligrams per deciliter is, worrisome. And the reason that number, was promulgated is because that is a level where uric acid begins to precipitate in the blood and can then lodge in the toes that we call gout.

It also can form crystals in the coronary arteries, in the prostate can do a lot of bad stuff. But the reality is, when you look at the vast number of epidemiological studies that look at people's uric acid levels arranged by quartiles from lowest to highest, it really appears that at around 5.5mg per deciliter, is when, metabolic issues begin to rear their ugly heads.

So over the years, you know, and laboratories will still say anything under seven. And uric acid is fine. Well, it's not good enough. You know, they may say you're in the normal range, but for you, anybody that you would deal with or that I would deal with, we want people not in the normal range.

We want people in the optimal range. That means let's get uric acid level below 5.5. We know that, having levels higher. One study looking at published in the journal Arthritis and Rheumatism, looked at 90,000 people.

That was 42,000 men and 48,000 women, followed them for eight years and found that those individuals with the highest uric acid had actually a 16% increased risk of all cause mortality.

That means a dying from, any cause whatsoever. They had a 35% increased risk of dying. What's called in a schematic stroke, that means a stroke caused by blockage of an artery.

And they have a 39% increased risk, almost a 40% increased risk of dying from a heart event. And again, this was stratified based in comparison to their uric acid levels.

So, it's important. And, I think that more and more doctors are getting this message. I'm seeing it in the literature now, in books, even working its way into lectures that people are talking about it.

So, you know, it's not the end all, it's, you know, but it's it's certainly on the team, and it's very important, as is measuring insulin sensitivity and, markers of lipid functionality, etc., I think they're all important.

But this is a new tool in the toolbox. And I think, you know, the beauty of, of uric acid is we know what causes it. You know, it's not so clear what lifestyle issues are related to hypercholesterolemia.

It's less clear what lifestyle issues are related to hypertension. It's pretty clear how diet relates to diet type two diabetes risk. That's pretty darn clear.

And it's very clear, how certain lifestyle choices can either augment or decrease uric acid levels. So maybe we can talk about that for just a moment.

Uric acid in the body is made only from, three things. The breakdown products of our of DNA and RNA that we would get, for example, from certain foods.

And the breakdown of our own tissues liberates cells. They break down the DNA, and RNA is liberated, and that forms something called purines. Purines contribute to the uric acid pool.

Alcohol, when it's broken down, increases uric acid. But the big, biggest player by far, which is incredibly overlooked, is fructose. That is a sugar that we are consuming now left, right and center.

Now that high fructose corn sirup is so ubiquitous, or its derivatives as a sweetener in more than 70% of the packaged, foods available, to Americans, that's the elephant in the room.

And yet, when you go on any of these, fancy clinics websites, and to learn about how to reduce your uric acid, you see, limit your purine. Stop eating a lot of meat.

In high period foods, like, small fish, anchovies. Other bad shellfish examples, as well, and cut back on your alcohol for whatever reason. I kind of know the reason, but I'll leave it at that.

For whatever reason, they don't like to mention sugar. I'll let your viewers kind of think about why these major citizens wouldn't be wanting to derogate sugar.

But clearly, with the, incredible increase that we've seen in uric acid for the past 50 years, in lockstep with our increase of fructose consumption without any real changes in alcohol and purines, it seems to be related.

So so having said that, what what's a simple thing that people can do? Well, you can cut back on your fructose consumption. That doesn't mean don't eat fruit.

It means don't drink fruit juice. You know, if you eat an apple, if you drink a glass of orange juice, you're getting 36g of sugar in a 12 ounce glass.

Drink a Coke. It's the same. Either eat an apple that's only five grams and it's delivered to your body slowly. Because of the fiber, you increase your uric acid excretion because of vitamin C, and you decrease uric acid production because of the, bio flavonoid content of eating fruit.

So have your apple a day and keep the doctor away. Or two, but not six. But the point is, there are lots of things we could do to rein in uric acid. A couple of nutritional supplements, quercetin, for example, luteal and, vitamin C I mentioned a moment ago are all really helpful to lower uric acid and empowering part.

Glucose Monitoring and Brain Metabolism

You can measure your uric acid level at home just like you measure your blood sugar. You can go online and buy a uric acid monitor to fingerstick and determine every couple of weeks what your uric acid level is.

Then you get a sense, just like you would if you're following your blood sugar, as to what your uric acid is doing in relation to your lifestyle, choices, in relation to your sleep, in relation to your exercise and most importantly, your food.

And included in that are what you drink. And I know people like to sweeten and add things to substances to make them taste good. They want to bake. They want to make a dessert.

I know when I read your book, I was looking. I already had been using things like stevia and monk fruit, sweetener and alternative sweeteners. But I was surprised to learn about alkalosis and that being an option and how significant and beneficial an option it could be.

Will you say a little bit about loss as a choice related to how yours is a a relatively new, sweetener that's available and, it is associated with reduced appetite unlike any other sugar.

It actually functions incredibly new research shows that it has what's called GLP one, activity. You know what? What does that mean? Well, it means it stimulates a particular receptor, that has been associated with significant weight loss.

You know, there's a huge, push these days for people to use ozempic. It's a drug. How does it work? It's a GLP one agonist. It works by stimulate the GLP one receptor, in the pancreas.

And, idlis works the same way. So, you know, new research is showing that even with consumption of carbohydrate, that, blood sugars can still be normalized in people who use allulose, as a sweetener.

So, I think it's very, very exciting, that this is available because people seem to need to sweeten things, whether it's their beverages or what they're going to bake or whatever.

You know, my hope is that people get away from this trying to cater to their sweet tooth, which we all have. Yours truly included. Every person on the planet has a sweet tooth.

It's a survival mechanism. It tells you various things. It tells you the food is good for you. It tells you the food is not toxic. If it's sweet and it tells your body that winter is coming, so it needs to make fat, that's a signaling pathway for survival.

Allulose does the first two, but it, it doesn't trigger, fat production, which is something, as I mentioned, that fructose does. So, it's very exciting and I'm very anxious to watch the, you know, watch the evolution of this science.

And so people who want to do a little more than they've been doing previously, and maybe who are learning about uric acid, you mentioned they can do a finger prick.

They can get their levels tested on their own or in office, and they can look at the more functional range of 5.5 being an upper threshold rather than seven.

Of course, they can also look at cholesterol, blood sugar and some of the other things. Blood pressure, their weight and those will all be impactful as well.

If someone wants to go the next step beyond blood testing these things, will you speak a little bit about continuous glucose monitoring? For non diabetics as a preventive, when you go to the doctor for your fasting blood sugar, it's a snapshot in what would be better a video.

And what I mean by that is, you know, what the blood sugar was on that particular morning, but you don't know the dynamics of blood, or you don't know how your blood sugars responded to the food you eat, the sleep you get or don't get, the amount of exercise you get, etc.

but now you have the technology that allows it to happen. It's called a CGM or continuous glucose monitor. One common brand is called Dexcom and there's Libra as well.

There are various brands out there, and these are devices that, stick to your deltoid area. I guess you could put it elsewhere. You don't even know you're wearing it.

You can shower or do everything you want, but when you want to know your blood sugar, you just turn on your smartphone and hold it near the monitor and instantly you know your blood sugar.

And it will record your blood sugar throughout the course of the day and night. So you get a real sense not just as to what your blood sugar was with your annual physical on one particular day.

But how does your blood sugar respond? For example, in my case, cashews. Cashews raise my blood sugar. I don't know why, but it happens. I would never have known that if I wasn't wearing a CGM or continuous glucose monitor, blood sugar control is paramount for metabolic health, because blood sugar control means that your insulin sensitivity is working well.

You can mess up your your insulin sensitivity when your blood sugar goes up. The higher your blood sugar, the more you're taxing your pancreas, the less your cells are going to be responsive to insulin.

And insulin resistance is a big, issue as it relates to your brain. We often don't think about insulin resistance as it relates to the brain, but the brain, is fundamentally requiring of insulin, because in the brain, insulin acts as what we call a trophic hormone.

And this will get back to another topic I want to talk about before we close. So CGM is extremely valuable. I, you know, I've written about it and done a lot of podcasts on it.

There is a software that looks at the data. It can give you some great information. And so, you know, there's a lot of things that we can do to really get a handle on how our lifestyles are affecting our blood sugar, and that's front and center.

So important for metabolic health. So the software I uses is something called levels health. And I'm on their scientific advisory committee. Full disclosure.

But I think this is critical I mean I have a new CGM, upstairs, I'm getting ready to snap it on. Yeah. That's important. And I was surprised myself to find some things that that spike a little more.

And for an optimal range of you use the 70 to 140. Is that where you're looking to keep the window of blood sugar within and not have it rise? I think that's that's a a good place.

But I would say that, you know, there are other factors. For example, the rate at which your blood sugar changes is also really kind of important. And the total area under the curve, meaning, you know, it's a marker of how elevate your blood sugar was over a period of time.

And it's also very valuable. My blood sugar runs low. I mean, I can run in the upper 50s and still feel pretty good and function just fine. So I kind of have a lower set point, and then I have my excursion within that beginning at that lower set point or lower, metric, lower value.

And I think it's going to it's going to vary with people. But you know, get back I think to original question beyond CGM, if we can go to another place.

Yeah. I think it's valuable when people do get their blood work done to get a measurement of their fasting insulin level. That gives you a sense as to their insulin sensitivity.

So very, very important. I think, you know, this is really where it's at. We're focusing on insulin, focusing on blood sugar. I mean, obviously an A1, C is somewhat, valuable as well as an average marker.

But I think what I'd like to know when we look at this A1, see, this is the so-called average blood sugar. This is a marker of a process, a process of sugar binding to protein.

In this case it's hemoglobin protein. And that's what that test measures. So while you could say well I want my A1 c below, whatever the number is, six or whatever it may be, if it's 11, you know that you're binding sugar to the proteins in your body well beyond hemoglobin.

You know, it's happening throughout your body to various proteins. And that's important because the more that happens, the more inflammatory that is. And again, blood sugar elevation, another source of inflammation.

We talked about the leakiness of the gut. We talked about the changes in the gut bacteria, that can lead to this leakiness that can increase inflammation.

Now we have another, avenue and that is this elevation of blood sugar via the changes in our proteins that actually change their Three-Dimensional configuration.

When they bind sugar. And that can make them pro-inflammatory. So I think it's nice to know your A1, see if you want to believe that it to measure of your average blood sugar.

And to some degree that's helpful. But it's a marker of this process of changing your proteins. And that's something that's actually very important. I want to mention one of them.

And that is as it relates to inflammation. Inflammation is on a teeter totter with something called Bdnf brain derived neurotrophic factor. I'll explain.

There's this trophic chemical that is really, really good for the brain called DNF brain derived neurotrophic factor. It allows us to grow new brain cells.

Who knew we could grow new brain cells? It allows us to form new connections, of our brain cells called synapses. Very, very important for preservation of cognition, but also for memory formation.

Basically, beating F nurtures the brain, if you will. Higher levels of inflammation tend to shut down. The production of Bdnf and lower levels of beating F are associated with Alzheimer's risk and are also associated with depression.

And as a matter of fact, interestingly, when in laboratory animals, you reduce their ability to make, big enough, it increases depression. Increasing BD and F is something that these SSRI antidepressants actually do.

Another mechanism they increased beating F, and that may be yet another reason, that they may target depression in again in laboratory animals when you give them these drugs like Prozac but you don't allow them or you use a type of animal that cannot make Bdnf, then they're depressive symptoms.

Exercise, BDNF, and Practical Takeaways

However, you measure that in rodent, are are not improved by giving them the antidepressant medication. Now, one of the best things you can do to increase the production of Bdnf in your body is physical exercise, that strength that taxes your muscles.

So muscles secrete this chemical Bdnf, that influences the health and functionality of the human brain means one organ system. The muscles are affecting another organ system in the central nervous system.

And that means then, that our muscles should be considered to be an endocrine gland, like the siren or the pancreas, because the thyroid creates chemicals that influence other areas of body, the muscles are influencing the brain.

It's the reason that exercise is so strongly recommended as a brain tonic to keep the brain healthy. Associated with increased growth of the brain's memory center, called the hippocampus.

It's why exercisers likely are much less likely to become depressed. So, you know, I think it's great to talk about, and there are changes in the gut bacteria, truthfully, more diversity in people who exercise versus those who do not.

Well, this has been fantastic. We've we've talked about how many of the chronic degenerative diseases of today have a backbone of inflammation, and metabolic dysfunction is the at the root and the cornerstone of that, the gut microbiome dysregulation or dysfunction is commonplace today for a variety of reasons, and that there are actionable steps that people can do.

They can measure blood sugar through labs as well as CGM. They can measure blood pressure. They can look at your at acid levels and have more of an optimized range.

For those with 5.5, they can look at their markers related to their body mass index and weight gain, and they can look at their cholesterol, and they can look at some of the aspects related to things like brain derived neurotrophic factor and exercise playing a role.

So with diet, with exercise, this is fantastic. These are things people can do. If you're if we're going to summarize and boil this down to what are some of the most important modifiable variables, aside from what we've mentioned so far, is there anything else to add as we wrap this conversation?

No. Actually, I think, you know, if we can leave your viewers with the notion that these, lifestyle choices that we've already talked about getting enough exercise, making sure you get enough restore, restorative sleep, and then you have a diet that's really lower in refined carbohydrates and sugars.

Boy, that's that's a home run. You know, we're hearing a lot of, talk these days about our consumption of what are called ultra processed foods, meaning basically foods that have been so processed that they raised blood sugar really dramatically associated with increased risk of various forms of cancer with Alzheimer's disease and certainly diabetes.

The sobering statistic is that 58% of the calories consumed by Americans comes from ultra processed food. So it isn't easy. But, you know, if we can just get 20 minutes of exercise out of people every single day, I think that would be a great place to start.

Fantastic. Any where can people go if people want to find out more? People want to learn more. People want to follow your blog, read your books. Where's the best place for them to go?

I'd say the clearinghouse would be Dr. Perlmutter, doctor Perlmutter, dot com. That's where you find on my blogs. My Empowering Neurologist podcast, information about the various books I've written.

And, and we do a lot of interaction, on the site, too. We, we get a lot of information that comes in and we comment on it, so that'd be the best place.

Doctor perlmutter.com I do, and I have a Facebook site and Instagram as well. So I do a fair amount of that, but that'd be the place to start. Doctor Perlmutter, you've inspired hope and empowerment and people I believe through this conversation, it's really important that people have actionable steps they can do.

I think people are walking away with several things they can do assessments they can monitor, and actions they can take in their life. That's what a lot of people need right now to have hope around some of these things.

So thank you so much for thank you, Doctor Nichols. I enjoyed spending time with you today and thanks everyone for watching. This has been another episode of the Microbes and Mental Health Summit.

Take care. Have a wonderful day. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health.

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