Introduction and Background

Welcome back to the Reverse Alzheimer's Summit. I'm your host, doctor Heather Sanderson. And I'm so pleased to introduce you to talk to Dan Goodenough.

His research into the biochemical mechanisms of disease started in 1990. His curiosity about the biochemistry of life is as insatiable today as it was then, 30 years ago.

In those 30 years, Doctor Goodenough invented and developed advanced diagnostic and bioinformatic technologies, designed and manufactured novel biochemical precursors, and identified biochemical programs of numerous diseases, including Alzheimer's.

He also has studied Parkinson's, multiple sclerosis, stroke, autism, ALS, schizophrenia, bipolar disorder, depression, cancers like colon cancer, pancreatic, ovarian, breast, lung, kidney, liver, and stomach.

He is just getting warmed up and you can see why I'm so excited to have him here today. He's now going beyond disease. His new focus is to defeat the entropy of aging by creating strategic biochemical reserve capacity such that the human body can maintain the physical and biological functions of life indefinitely and without disease.

That is a tall order, but one that I know everyone here is excited to hear more about. Doctor Goodenough, welcome. Thank you very much, Doctor Sanderson.

And yeah, it is. It sounds like a tall order, but like all big projects, they start one brick at a time, right. And and as you break things apart into their individual components, the complexity becomes less and less.

And aging. Alzheimer's, neurodegeneration. Most of these things seem so insurmountable because we look at the whole picture all at once. It's like having a messy house and don't know where to start.

And then if you say, you know what, I'm going to start in one room and I'll get. And then by the time you're done, you know, it doesn't look the same as it did when you start.

I think aging in these complex diseases, they will they overwhelm us because we think of them once they're here. And we don't really understand how we got here, and we don't look at where did how do we get to this level of neurodegeneration.

And the human body is designed to work. And I think people throw out all the basic logic that they use in their everyday life when it comes to their health, because health feels like a black box.

You know, how does my heart work? How does my brain work? How does this. It's also foreign in the words that scientists use and the technology. Is it just it just people just shut off.

They can't think about it. It's just feel so far beyond them. And then, then that's. And then they sort of they just kind of wait for something to happen, and then they wait for someone to tell them what next.

And so my background is in science and my PhD in psychiatric medicine, looking at the biochemical mechanisms of disease. And built a lot of technology looking at what causes disease and, you know, you don't walk down the street and get hit by lightning and have colon cancer the next day. Right.

You have there's a proton, there's a, there's a, there's a period where you become at risk for a disorder. And then that risk eventually translates into, you know, clinical manifestation.

And so the question really becomes is where does this all begin? And then to do that you get to understand how, the systems are designed to work in the first place and then work from there.

And so Alzheimer's is an interesting story. It's one of the, you know, benchmark for beachheads, if you will, of this preventative medicine regeneration restorative model, because it affects so many people and it affects it's such an emotional disease.

You know, you get cancer. Yeah. So obviously it's bad you die. But if you die of cancer, at least you die yourself of cancer, right? When you die of Alzheimer's, you don't even die as yourself.

It's a very, very tragic disease in terms of not not obviously for the person suffering from the disease, but all the caregivers around them. And so understanding this disease is, you know, very, very important.

And, you know, reams and reams of data have been generated over the years. So my contribution to the field really is looking at those biochemical mechanisms and understanding, you know, is this just a one way street to death, or can these systems be rebuilt, regenerated, restored?

How the Brain and Alzheimer's Work

And then obviously, can we prevent them from from degenerating from the first place? And the Alzheimer's? There's the people think about, the brain, and they have a lot of misconceptions about how the brain is organized and how the brain works.

And they think in the sense of complexity that it's not. It's that people think the brain is like a computer, but the brain really isn't like a computer.

It's more like the wiring harness of your car. Okay. It's a bundle of wires that connect different pieces. And just like the wiring in your house where you have the copper wire in your walls that are protected by a protective sheath, and then you have a light switch on your wall that that connects these wires.

And so your brain is like that and your brain is like a beach ball. And the outer part of the brain, the surface area is the largest surface area. And that's where all the connections typically take place.

And then in between those you have these fiber like the wiring harness of a car. And that's typically when people talk about white matter and gray matter.

The white matter is that connectivity like for autism and multiple sclerosis type diseases. And then in diseases like Alzheimer's where we're dealing with typically synaptic function, but it's not that cut and dry.

It's a little bit of both. And so neurons and Alzheimer's I deal with a very specific part of the brain. But all newer generations are not isolated. People who have Alzheimer's have other neurodegenerative disease issues as well.

Right. People with Parkinson's will have Alzheimer's like like issues and so on and so forth. So generalized brain health is still generalized brain health.

But the trick the key of the human brain are those two components. One is the wiring, the complexity of the wiring that goes from A to B. And then there's the connective part.

And the scientists, you know, we call the the white matter the the the fiber bundles, if you will, the wiring bundle. That's like the corpus callosum.

It's what connects the two sides of the brain. And then the switching is your synapse where the two neurons connect with each other. And that's biological.

Those are living cells that do that. Like it's not like copper and metal that's in your car. This is these are living

things. These are things that we we regenerate even all the time.

So they're they're they require a supply of materials. They were part they require the supply and you know, diffusion. And so Alzheimer's cognition is fundamentally a disease of one class of neurotransmitter.

And that's the called easy to clean. And that's what the brain has a bunch of these different types of wires for different purposes. Just like you have wires for your tail, lights of wires for your car engine.

And one type of wire, which is these cholinergic wires are the ones that are more involved with our cognitive ability or executive function memory, and so on.

And these more these neurons require a certain type of electricity, you know, power goes through these wires is a molecule called acetal cooling. And so we will take, you know, acetylcholine drugs like, aricept, for example, that extends the, the activity of that neurotransmitter in the, in the switching plate, the synapse, but that the cooling is what connects the two parts.

So when you when you flip a switch on your wall, you're physically connecting two wires with that switch is either disconnected or it's connected. But of course your brain is biological and your brain moves neurotransmitters across this this little gap called the synaptic cleft.

And it's like having a showerhead, like when you, when you when you have a showerhead that has the multiple little outlets. And if you just turn your shower head off and on, off and on, off and on, off and on, that's kind of how a synapse work.

It just pulses these pieces of things and they connect across. And that requires a lot of and that's how the biochemicals go across. And the biochemical that goes across for Alzheimer's is called a seal cooling.

So I have a question there. So many people have been prescribed aricept, and it's an Ace inhibitor. So it keeps maintains more stable choline and that's enough.

But this doesn't help. So if that's the explanation for what's going on, then why don't those medications help more. Well they help symptomatically okay.

So the silicone inhibitors have been very reproducibly shown to improve cognition short term. But they don't change the fact that your brain is degenerating.

And so then the question is, is what what's the normal process. So basically what you're doing there is you're just juicing up the synapse with the silicone inhibitor.

Okay. You're not changing the, biology of it. And so I don't get get in the weeds. So what happens though is this what's what happens in the biological brain is that we get synapse release of neurons.

So the neurotransmitters. So neurotransmitters are held in this little sphere called the vesicle okay. And it's trapped in there. And there's a, there's a there's a signal called a action potential that signals the body to release these neurotransmitters.

And that's a that's a physical. It's like a it's like a soap bubble. Right. And it has to hit the membrane and it will burst. And when it burst it opens up and it lets all these neurotransmitters go into the camp.

Now this is the scale at which the human brain does. This is massive. Okay. If you take a look at it, if you think of each one of those vesicles was a grain of sand, okay.

You have the same amount of vesicles in your brain as there are grains of sand in the Hoover Dam. Okay, that's how many vesicles you have in the human brain.

It's an enormous a number. And more importantly, those vesicles burst and reform at it Hertz rate of around 100, which is 100 times per second. So that means the Hoover Dam in your brain.

All the sand is bursting and reforming, bursting and reforming 100 times a second. As you're listening to me speak right now, that's the massive scale of the human brain computing power.

Okay, it's still from a Hertz rate. Like you get a gaming computer, okay? The human brain is still operates at a capacity almost larger than all computers combined sold in a year.

Okay. That's how. And it allows the human brain to basically reach quantum mechanical capabilities. So when we create a thought, okay, when you think you are creating a new thing from nothing, like it's almost like a quantum mechanical process and what allows you to do that is this large network of these vesicles bursting, neurotransmitters releasing, and then they combine into thoughts and we direct our thoughts.

So this is why we can decide whether to have a chicken salad or a steak for lunch. Right. There's somehow we're able to move our consciousness using this power.

And it's tuned. And we get better and better at it as we get older. Then we reach a point where we we can't perform all these functions. So when we get into those issues.

So the ability to actually form vesicles and release vesicles is a biophysical process, okay. And it takes actual biological molecules to do it. And these molecules are lipids called phospholipids kind of like soap in your.

And it's a special type of phospholipid called plasma allergens that are particularly important in releasing these neurotransmitters. And these are molecules that you decrease as you get older.

And the other thing people think about. So Alzheimer's, people think ultimately there's usually three things that people think about. They think about neurofibrillary tangles.

These little, protein, tangles that formed in the brain get amyloid plaques, which is this, extracellular formation of protein, and you get brain shrinkage.

Okay. Now the brain shrinks like a when you take a grape and a great shrinks into a raisin, it becomes dehydrated. Because what keeps a grape plump on the outside is the the fullness of water inside that. Great.

Now your brain is made of fat. Okay? Our brain is lipids and fats and membranes and membranes are what gives us the compartmentalization. So when you're when your brain shrinks, what you're doing is you're losing the fat of your brain, okay? That's what you're losing.

Like a grape loses water to become a raisin, the brain loses fat membranes, has to become a shrunken brain. So those that's a physical loss. You're actually physically losing matter of the brain.

And that's and it's a shrinkage process. So the question is, is why, why, why are you losing these molecules or you're not making enough of them? Or are you consuming too many of them?

Or are they mean are they being broken down too fast? And so that's the critical component. And the other part people forget about if there's basic operational fundamentals.

The human body is made of membranes. And so when we talked about compartmentalization, you want to be able to do certain things in certain areas just like in your house.

Right. You have things you do in the kitchen, things you do in your bedroom, things you're doing your bathroom. And you compartmentalize those activities and you compartmentalize those activities with walls.

We even compartmentalize greater. We place things that we do in our house that we don't do at work, and we do.

We have buildings. And and so our world has compartmentalization in it.

Even body has the equal level of compartmentalization. But again, it's biological. So all these wooden walls and steel walls that we build around us, our body makes those things, but it makes them with the material.

And the material that the body makes. Uses is called phospholipids. And phospholipids are this fat. Basically, they're like soap, and they have a polar head group at one end and a nonpolar side chain.

And they, they, they organize into what's called a phospholipid bilayer. It's basically it's a wall. It's a biological lipid wall. And that's what gives your body the ability to compartmentalize why your heart is separated from your your brain.

And then even inside, like when I talk about that wire in your wall, you have that coating is separated from the axon in the inside. And what separates those two things are these biological membranes.

These biological membranes are made of phospholipids. Plasma are one of these phospholipids. Some of these phospholipids we get from our diet, like our fossil coin pulling, this big thing they get from eggs, we get it from sunflower.

A lot of sand or soy. Lapis and choline is a critical nutritional molecule. Technically you can talk about acetylcholine. And then now this is fat. The alcohol about the coin, which is in the membranes.

And so are those related to each other. So if I do eggs, right, that coaling is really important for multiple reasons. Yes. And so this is some this is a fact that most people don't realize.

All of the neurofibrillary tangles of the human brain that form in Alzheimer's are caused by inhibitions of an abusive chemical system called methyltransferase.

And this is a system that your body uses to make choline. So calling technically is not an essential nutrient. Okay, in the list of from whatever organization gives you the list of essential nutrients because your body can technically make calling, but it's energetically demanding to do it.

And if you don't make enough of it, your body starts scavenging other things for it. And so when people think, oh, donors, it sounds like as well, because this is a methyltransferase.

So if you don't have enough of those carbon and three hydrogens, then it's also going to be a struggle to explain. And this is why high levels of homocysteine.

If your doctor talks about homocysteine levels right, you want to keep your homocysteine levels low, not artificially. You don't want to fake it by like a lot of the blood testing, a lot of you.

There's supplements that you can take that will arbitrarily lower homocysteine. But homocysteine is a very valuable biomarker because it indicates how much your body needs or is deficient in it.

And so choline, like fossil coin like from a lettuce and soy latte. And then the other one that's important is creatine. Good old fashioned creatine is another thing that we use for muscles.

Our brain use a lot of it. But that's also big driver methyltransferase. So choline is in your membranes. And choline is also used for Alzheimer's. And the neurotransmitters see the colon.

And this is what makes Alzheimer's so unique versus other diseases because it uses a neurotransmitter called a silicone. But choline, the molecule part of it is such an it's a it's an essential.

Acetylcholine, Membranes, and Plasma Alogens

It's in all of our cells. So when you talk about Parkinson's and we talk about the dopamine system. Well dopamine is a unique molecule. It's only found in the dopaminergic neurons.

And it has very specific proteins. It only recognize dopamine. So when you take L-dopa for Parkinson's it's only affecting these these neurons the Parkinson's Alzheimer's the the cooling system is all your neurons have cooling okay.

But they have a selective. So so you have this this this strangeness with, Alzheimer's and that the neurons, they don't take up their neurotransmitter like a Parkinson's neuron, like for the dopamine neuron, when it releases dopamine, it takes dopamine back up.

And when it recycles it, it when it recharges itself, dopamine leaves, dopamine comes back. Alzheimer's. That doesn't happen. What happens in Alzheimer's is see the curling leaves.

Does this work? It gets broken down and then choline comes back. So it actually and then it remakes. It actually re synthesizes the the neurotransmitter in that neuron which is very different from, you know, depression or anxiety.

People dealing with serotonergic system or people hear. But the more adrenergic system, the cholinergic system is a very unique system and is unique because it has a special protein called the choline high affinity transporter.

And I'm getting the weeds. But this is what brings up that neurotransmitter. The what's weird about Alzheimer's is when I mentioned that that process where the vesicles form and release the neurotransmitters, that membrane fusion process, the protein that brings the coaling back in, that allows that neuron to recharge itself for the next sitting, next pulse, that protein is actually on the vesicles that gets that gets formed.

All of the neurons that the re uptake protein is just sitting there, okay. In Alzheimer's the re uptake protein is on the vesicle. So anything that disrupts vesicular formation starves the neuron of cooling.

And we get what's called auto cannibalism and shrill shrinkage. So membrane fusion is one of the most critical components. And and is for all neurons.

But but the Alzheimer's neuron is most sensitive to that. And so and plasma allergens are the molecule that require that are used for membrane fusion.

And so it's obligate membranes can't fuze together without plasma allergens in them. And we we lose plasma allergies as we get older because we can't get them dietary.

So all these are and you have lots of them 2,030% of your entire brain lipids are these plasma allergens. And you make all of them. Because if you eat a nice healthy say, oh wow, I love these plasma allergies, right?

So if I'm eating animal products, I'm eating fish, I'm eating this. I should be getting plasma allergies, right? But that's not true because a weirdness of their, their their structure, like they're designed to be sacrificed.

So they have like a little fuze in them called the laser bond. And it blows up it it will the body makes these plasma allergens so that it will get, consumed and protect other types of molecules.

So you make lots of them, but then you use a lot of them. The problem is that when you eat them, they're acid sensitive. So as soon as they hit the stomach acid, the acid in your stomach, they burst up.

So when you eat a plasma allergen from a fish or from an animal or from whatever, very little of that actually gets into your blood supply. So there's very little nutritional availability of plasma allergens.

So your body must make them all. And the body can make it from anything like it's a really it can make it completely from scratch, not dependent on any dietary selective molecule to make your plasma allergens.

But problem is, you are now dependent upon your own biochemical synthesis. And it's made in a very special organelle called approximate. Okay, so some of you may have heard about proxies.

Some people take, fibrates for people that want high triglycerides when they try and get their triglycerides lower. Okay. So again, for Alzheimer's, you want to make sure you keep your triglycerides, your fasting triglycerides under 100.

That means your proximal function is working. So people that have low people that have low triglycerides and high HDL usually have good plasma allergies.

Those kind of those three things kind of go together in your blood testing results. I what I noticed is that people who eat a lot of sugar tend to have higher triglycerides, and as they reduce their sugar intake, those triglycerides come down significantly.

Have you seen the same thing? And do you find is there a correlation between sugar intake and personality and synthesis. Yeah. So what happens is okay so you know in your when we measure fasting triglycerides okay.

When you when your doctor says hey let's get a blood test and the fasting triglycerides, they're not measuring the triglycerides you eat. They're not measuring the olive oil in your cupboard.

Or you know, whether you're eating bacon fat or not. Okay. What you're actually measuring is what your body is making. Okay? You're actually measuring your body's synthesis of triglycerides because that's what your body makes to store for later.

So when you have a meal that you have your body has two years, you have the fed state and the fast in state. In the fed state, I've just eaten a big meal.

My stomach, my intestines are full of food. They're digesting proteins and fat and carbohydrates, and they're sending all this energy into my blood supply.

And it's far, far more than what I can use at this point in time. Cleansing my liver. The liver says, well, I cannot possibly use all this stuff, so I'm going to store this stuff for later.

And so what they'll do with your liver does then, is it packages the extra energy on triglycerides. Good old oil. Same. Exactly the same chemical structure as the oil sitting in your cupboard.

That's what your body makes exactly the same stuff. And it sends it to your fat cells for later. So after a meal, your triglycerides could be like a thousand.

Like your blood could be white with that. Okay. That's normal. Okay, well not normal. Normal. But it's it's possible. And it happens all the time. But then after a period of time, your intestines that all that, all that food that you've eaten gets digested and burned up.

Okay. And at some point, you run out of that energy that you obtain from your meal, and now you're now your body has a switch from this fed state to the fasted state, where it shifts to the faster state.

Your fat cells become your stomach and your intestines. And so your body starts digesting that stored triglyceride in your fat. And it sends this energy again to your cells, your body, your liver, and this and that.

When it gets to those cells and those cells can't process it, okay, they're weakened or they have they're they you're diabetic because you can't have your sugar issues.

Then your body said, hey, I can't even process the energy that I'm sending from my fat cells. And so your body starts remaking triglycerides and sending it back.

So when you have when triglycerides are over 100, that means that your energy of your cells, your cell, your cellular energy capacity is, is is impaired.

And it's usually either proximal or mitochondria. So to your question of sugar and diabetes, and high blood sugar, these are systems of reduced glycolytic capacity of your cells means your cells can no longer process glucose properly.

And so glucose builds up and you into glucose builds up in your blood. Your body says, oh, I can't have that. And so your body starts pumping more and more insulin says, well, I'm going to start pushing this.

I'm going to start pushing this glucose down. And that's what insulin resistance is. Insulin resistance is simply caused by your cells being unable to process glucose.

And so your glycolytic capacity is low. So it could be proximal could be mitochondria. But your energy is bad. And so fasting exercise all these things better diet that that reduces your glycolytic food supply.

So that those all those things they reduce the glycolytic load of your cells. And if your cells can now process the glucose, it's there that all of a sudden there's there's less glucose in your blood, there's less requirement for insulin.

And insulin resistance disappears because you don't need insulin. You're you're no longer insulin resistant because you you are actually digesting. You're processing the glucose that's coming in.

So all that goes hand in hand. So people like that are on, sugar in our diets. Or more importantly, the intermittent fasting is very, very important because that allows the body to build and proxies homes are you're building cells, organelles.

Mitochondria are your burning cells. So your body works like your your iPhone. So like during the day you're running around, your phone's unplugged and it's busy.

The light's bright and it's doing this and it's doing that. It's checking this and checking that is on whatever you're doing on your phone. Right. And it's burning up energy.

It's it's not doing background checks and making sure everything's ready. Then the day ends and you plug it on your charger or the light goes off and it starts recharging.

Okay. That's your fasting state, okay? The human body is designed to work during daylight hours. Okay. And then at nighttime, when we're not supposed to be eating and we're not supposed to be, you know, we we have this caloric restriction, this natural caloric restriction that occurs during our day.

And that body, your body switches to the fasting state. And when you're in the fasting state, you're you're running on fat energy triglycerides. And that's when you build your hormones.

All your hormones are built, your membranes are built, your plasma engines are built. So your fasting state is really critically important. So this intermittent fasting or at least having only one insulin pulse per day okay.

And so if you have to snack have non non insulin sensitive sizing snacks. And you know I always tell people to skip breakfast like if if you can wait and have your first meal at 2:00 in the afternoon.

That's the best way to getting intermittent fasting, skipping breakfast is the best way to get that. If you can get all your calories in like a 6 to 8 hour window, it's one of the most healthy things you can possibly do to the human body.

And it does it because it actually helps make these plasma allergens. Okay. And get those plasma slices into the brain. The other thing that people miscalculate is cholesterol.

Cholesterol got a really bad name. The other really critical fat for all your memories is cholesterol in people. With people. We get really freaked out about this.

We genotype. But, you know, if you when people get cholesterol levels below total cholesterol, below 200 really increases your all cause mortality, increases your Alzheimer's issues.

You know, we talk about HDL and LDL, but these are the fats that are part of our membranes and our ability to keep these all these membranes. So plasma is off the bat.

And it's such a breath of fresh air to hear you say this. Right. Because this is also the backbone of our stress hormones and our sex hormones, all of that signaling going to our brain.

And when we're told over and over again, it's getting flagged at 200. Even though the American Heart Association and the American Diabetes Association say that you do not need to have that under 200, your total cholesterol under 200, unless you have active heart disease or active diabetes.

So there's a whole chunk of people who are being told by their primary care providers that they need to take statins because their total cholesterol is over 200.

When that's not, no one is really suggesting that's a good idea if you if you look into it, but it's getting flagged anyways. The lowest rate of all cause mortality in humans is cholesterol between 220 and into 60 period.

That's 162 countries, probably 30 million subjects. Okay, as soon as your blood cholesterol, your total cholesterol levels gets under 200, your all cause mortality doubles.

Okay. Having passion. Right. You you're you're background is in psychiatry. It's depression. Anxiety. When I see, somebody's cholesterol at one 4130, I just go, oh my gosh, how you're not producing sex hormones.

You're not producing any of the things that are going to be necessary for you to maintain a healthy mood. And a. Exactly. And your HDL levels are really critically important.

Getting your HDL above 50, it certainly should be above 60. When HDL starts dropping below dropping below 50, you know, if you're coaling deficient, your body can't share cholesterol, okay.

Like HDL, like you have two cholesterol systems. You have your LDL system, which is most of the kind of total cholesterol, kind of a proxy for that. But that's a cholesterol system that distributes cholesterol.

It's like I tell people is like an energy grid, okay. Where you have you have a main power plant. And then you also all the houses have their own little solar panels.

Right? So you have LDL system is the main power plant. It's sending cholesterol to all the cells. The body and the cells. It doesn't push cholesterol okay.

With the cholesterol your blood is not being pushed on your cells. They your cells will take the cholesterol that they want okay. Like when your house you take the electricity like the like.

You know, the power company doesn't push electricity into your house. You draw electricity from the grid as you need it, okay? And your cells draw cholesterol from the blood supply as they need it.

Okay. And so that's what the LDL system actually pulls it in the LDL particles because the cholesterol is fat. Right. Like you think about it, you can't take bacon fat and pour it down your sink.

Triglycerides, Sugar, and Fasting Metabolism

Right. Because it's going to just clog up things. So what we body does is it puts all this fat on these proteins, which

are highly water soluble. And so they stick on these proteins.

And that allows the body to distribute these fat molecules. Because your body's basically water, right. That you have all this aqueous water system. So we use these proteins.

One of these is LDL protein. LDL cholesterol to LDL cholesterol is a big piece of water soluble protein with one your cholesterol stuck on it okay. And and it gets distributed and your cells say, hey, if I need cholesterol, I'm going to pull cholesterol.

That's your LDL system. Now your HDL system is when you make your own. This is you have your solar panels, right? And you're saying, hey, I'm generating energy in my house, but hey, I'm making more energy than I'm using because I'm, you know, I'm not home today.

My solar panels are still working, but I got no nothing. No TVs on or nothing's on. So I'm going to donate some of my energy back to the grid. And so the HDL system is you're donating it back in, you're saying, hey, I am so healthy.

I am so energy efficient in my cells. I can actually share my energy with the rest in the brain. It's really important because your brain, your cells want to share their cholesterol with each other and they share their cholesterol using the HDL system.

And so if you have so HDL is how you get cholesterol out of your cells and distributed. And so that's your your your export. And the combination of those two things allows your body to tune and says okay I can get higher or lower.

So because all your cells are different and your your different, it's not, you know, you're even the even the three dimensional, the sphere of your of the cell.

There'll be parts of the cell that need more cholesterol in other parts. So need to be able to move that cluster around and share it around. And that's how it does it take us back to a body because of ApoE e4 for status.

We know people have a one inch two chance of developing dementia. Maybe three four is a 1 in 3 chance of developing that dementia way more than the average in the population, which I think is like a 14% chance.

So there's a lot of confusion about what we know and what we don't know about ApoE e4 or four status or 3 or 4 status. Having one of those ApoE4, wheels.

And what happens as it relates to fat synthesis. So we know that it puts us at risk for dementia. But fats, plasma allergens are kind of these phospholipids.

So they're half fat, half water soluble. Tell us how plasma allergens are related to this body and then fat metabolism in general. Yeah. So apathy is a big pet peeve of mine.

And it's in my book, I go through in great detail for AP carriers because there's a lot of work. And scientists love complexity. Right? Like it's like, how many angels can we put on a head of a pin?

That's what we do. All day long. It's, you know, we dig deeper and deeper and deeper. And if you dig deep enough, there's always something interesting to find.

Okay. But for all of you, April E4 carriers. Okay, let me just describe in very simple terms, because for Alzheimer's related issue, there's only one thing related to AP and that is reverse cholesterol transport.

That's it 100% okay. So I just talk to you a little bit about these proteins that move cluster around. So eight HDL okay. So the LDL, the mean cholesterol distribution is called apolipoprotein B eight will be and the main HDL protein is called apo a okay. The.

And so over the last 50 however many years we've studied these proteins we've labeled them okay. Now apolipoprotein B your LDL particle, that particle actually gets absorbed by LDL, receptors.

It gets pulled in. So when you take a step okay, what statins do is they block your body's build your cells. What stands do they turn off your, solar panels okay.

Makes your solar panels don't work. So turning them off. So the only way you can get energy or cholesterol in your cells is by pulling it from the grid.

So by shutting off your solar panels. Okay, we force the cells to pull all the class ruling from the LDL system. And by sucking all the LDL out, we bring our LDL levels down.

Okay. That's how statins work. So now HDL particles, they don't enter your cells. They stay on the outside of your cells okay. They're they're you know, the Fedex truck.

They're they're waiting for the cholesterol. Come out okay. When cholesterol comes out it'll take it out. So HDL particles cannot go in. Apolipoprotein E is very unique.

It's ambidextrous. It has it can be it can enter the cell. It can. It has both LDL activity and HDL activity. It has both things. Now in your brain. What makes it really important is your brain uses able E for both LDL and HDL functions.

So you do not have apolipoprotein B. There's no LDL in your brain. And there's very, very little A. Your brain basically uses apolipoprotein E. It uses it for both the LDL mechanisms and the HDL mechanisms.

Okay. So it uses for both things. So because you your your rest of your body is like an interstate highway system, I'm shipping things from Chicago to New York.

Okay. The brain is Chinatown, okay. The brain is a whole bunch of little streets connected by little. And so everything is local, right? And so you don't have these very big arteries moving things back and forth.

And so they use the brain uses apolipoprotein E because it can use it for both things. And how it separates the different functions is that there's different proteins.

Some proteins will bring in and some low. So long story short. So we now we have these alleles. So so when you get eight boey in the brain we have these different genetic mutations.

So you have the E2 variant and the E3 variant and E4 variant. And it's all related to this. Disulfide bridges like this. The cysteine bonds. So proteins connect to each other kind of like two magnets on a screen door if you will.

Right. And a sulfur and one and a sulfur another. They'll connect. And the mutation that makes the difference between the HPV genotypes is the ability to form these disulfide bonds.

And it affects only one protein in the brain. Just one okay. Is the critical one okay. And it's one of the proteins related to cholesterol transport. Reverse cholesterol transport.

So what happens for Abo e for carriers is that they have. So the difference in the AP genotypes is your ability to export cholesterol. So E4 carriers are cholesterol savers.

They don't they don't they're not leaky. Their cells do not leak out cholesterol. And that's protective for other things like viral infections. Bacterial infections is the reason why we still continue.

You know genome is that it actually has a protective genotype. And but as you get older, your compensation mechanisms for that cholesterol clearance becomes less.

And less and less. So that what what was healthy earlier becomes unhealthy later. So a natural E4 carrier should

have cholesterol higher like because your LDL levels.

Because an E4 carrier holds on to it saves more cholesterol than the other ones. So an E2 carrier can't carry can't hold cholesterol for the life of them.

So they're always leaking cholesterol. It's like a teenage kid with a with an allowance. It is spending it every week right. So E2 carriers are just they're making cholesterol and they're getting rid of it making it getting rid of it.

And so they can't hold on to cholesterol. So that's why LDL levels in E2 carriers are always lower in LDL levels in E3. Carriers are kind of in the middle and LDL levels in E4 carriers are a bit higher.

And that's natural. So that that and that's how it should be for them. Now the yin and the yang of cholesterol export are these HDL protein or these these protein export and plasma allergens.

So the other thing that drives cholesterol export called reverse cholesterol transport, HDL export is plasminogen levels in your membranes. Okay. So what happens.

So what we published in a large population in Chicago was that plasma allergen levels neutralize the genotype effect on Alzheimer's. So if your carrier with high plasma allergens does not have an increased risk of Alzheimer's disease, okay.

It completely neutralizes that. And that's important. Genes don't do anything okay. Genes have mechanisms okay. Genes give us I call it genetic adaptability okay.

Like people people think that genes are deterministic and they're not. There is no such thing as a gene for disease. Okay. There isn't it? It looks like it.

It feels like it sounds like it sounds like it sounds so normal. Sounds so logical. I have it, but it's actually not the case. We're born with your with adaptability to our environment.

Okay? Your genes have no idea what you're going to do tomorrow or the next day. Are you going to eat a pint of ice cream or do you need to stick? It has no idea what you're going to do.

And so they have to sit back behind their little nucleus and they have little sensors saying, okay, what what the heck are you doing to me today? Okay.

And then they're going to adapt to whatever they experience. So we have certain genetic adaptability. And if you if you if your environment gets out of your adaptable windows you get diseases you can't.

And so we each and so it's our responsibility to live within our genetic windows okay. Our genes can change to a certain degree. We can adapt like if you exercise right.

You're going to increase your your oxidative capacity and your body's going to adapt to your changing environment. So you can do healthy things to increase your genetic window things.

So you know what? I have more options available to myself now okay. My body can handle better adverse circumstances because I've trained it to do so. Okay.

Is like having a basketball player that only shoot hoops game. Yeah, all he does is go every day. He goes to goes to the free throw line and all he does is shoot free throws, okay?

And you go, wow, look at this awesome guy, man. He can just shoot hoops all day long. Well, you put him in a basketball game and he's crap because he can't play anything, but he can't do anything but shoot hoops.

You can't dribble. You can't move around. You can't pass, you can't block. And so so we train ourselves out of

these things okay. And so this is what bad diets will do.

And so this is where health style things do have major events.

Cholesterol, ApoE4, and Reverse Transport

But what they do is they they keep you from becoming more and more narrow in your focus. So comedic effect basically where you recreate a little bit of stress on the system, whether it's through calories or through temperature, like hot and cold or even with oxygen.

We can do this a little bit, with conscious oxygen therapy. And as we as we ask the body to do more, it's capable of more. And we want to make sure that as we age, we continue to do this so that our cells have that like you're you're describing this dynamic ability to respond to the environment and you have to give people enough time.

What I notice a lot with the athletes that I work with and aging, they think, oh, more is better, okay. But remember I so I tell people exercise is bad for you.

Recovering from exercise is good for you, okay? It's recovering from the stress. So you got to give your body enough time to actually recover from the stressor that you give it.

So it's good to work out, work up to complete exhaustion, to complete failure. But make sure you rest okay. It is at rest period that allows your body to recover and train itself.

Get prepared for the next long term event. So anyways, we're getting off and all these things. There's something that I have to ask you because a lot of questions that comes up most often with my patients and we've seen, maybe four, four carriers go on a ketogenic diet and have really great responses cognitively, and also that their their lipid profiles look better.

However, there's a lot of, I would almost call it like trepidation as people learn more about AP force for status or three for status, and they think about eating more fats or getting on a ketogenic diet.

And it particularly with MCT oil or coconut oils. There's a lot of confusion and questions around how these high fat diets might impact someone with ApoE e positive AP report status.

And so what I hear you saying is, well, maybe we can just override that by using plasma allergens as supplemental. Or is there like, do we understand enough about fat metabolism in the brain that maybe this isn't as much of an issue as we thought?

Or like we can't bring? It's the quality of the fat, okay. It's very, very important. And so the ketogenic diet, it's important to use it for its correct purpose.

Okay. So what you're doing is you're preventing you're extending the fasting state. You're preventing fed states from occurring. And your body should have at least one fed state per day for the most like.

You can go for fast. You can fast for a week if you wanted to. Like like those things. The caloric restrictions are good. Now when you burn fat, you create a lot of acid.

So the other thing with the ketogenic diet is people need to work on. They're not getting fruits as many fruits and vegetables in their diet. Those things reduce the acidity.

And so you need to make sure you should be checking people that are on a ketogenic diet shouldn't just be checking their ketone status. They should be checking the P to the urine, and they should be taking bicarb.

And they should make sure that their electrolyte balances are maintain your sodium, potassium magnesium balance. And those are very easy. There's lots of supplements out there you can take you know, they can get

seltzer gold. There's a pH, aloe.

There's supplements out there that give you bicarb. You want to because when you're when you're burning pure fat, you're creating a lot of acid. And that creates other issues for your body.

It makes it hard for your body. So you want to make sure you neutralize all the acid that you're burning, creating from from fat metabolism. So that's one thing.

When people get stuck on a huge ketogenic diet, they don't they don't keep track of their acidity levels and keep their and add tons of veggies, but it's not.

And then bicarb. We live in a very acidic environment. Good old fashioned baking soda. But you can get the potassium versions and, and it's, it's important to keep your acidity levels low.

It helps clear, things out of your, your kidney function better. When you're if you're on acute in a diet and you're exercising a lot, then you're creating lactate and that other additional acidic environment.

So you want to deal with that. Okay. And so one is that the. Yeah exactly that. So the fat diet is fine. There's nothing wrong with that. At all. Like anything in this world, you just need to deal with the quality of that.

Getting the lettuce and possible clean, in your food supply, add them to your meals is very, very important because these phospholipids, because just triglyceride is quite stressful.

So you want good quality fat. It's just like good quality, like carbohydrates. Not bad that you want complex carbohydrates. It's just via too much too much pure fat.

It's just like too much pure sugar. It you know, you're you're you're you're just replacing one, you know, evil empire with another. And so and so. Yeah.

So you want it. So you but it is, it is healthy. So I'm a big but you know you want to be a little. You want to create. You want to create a lifestyle that you can sustain. Right?

When you talk about longevity and you talk about mental health, okay. It's not a diet that you can do for a month or two months today. You need to be able to do for 30 years, right?

So you need to create a lifestyle that is sustainable. It has to fit within your your own personal environment. And you can't deprive yourself so badly that you feel that life isn't worth living.

And so you have to create programs that are sustainable and and logical. And that's, you know, because sometimes we get too fanatical about one thing, and then we can't maintain it long enough for it to give us long term effect.

So but the bottom line, those what you just mentioned is 100% correct. When people get rid of the the sugar intake. This is another part people we we don't measure like you think science has everything figured out.

We don't. Right. And and even if we did, you couldn't possibly measure it frequently enough in an individual to give them so much satisfaction. Okay, what happens when you stick to a ketogenic diet or a fat based diet is that you are spreading your day out, okay?

And so your your body isn't that smart, like it relies on you to be smart. So when you have a meal, when you eat a major meal, okay, you first part of your meal, you start digesting food and all of a sudden your, your body is experiencing all this glucose and things that it wasn't experiencing 20 minutes ago and said, and it has no idea whether you ate a chocolate bar or a four course meal.

Okay. It has no idea at that point in time. So it starts pumping up some instances, you know, I'm going to I'm going

to get some insulin going here, you know, put this glucose out.

Right. And and it can't it doesn't it has got it's got to somehow predict how much food you're eating that at that point in time. Now, if you just eat just enough sugar to elicit an insulin response, then that insulin works and it's still there and there's no sugar left.

And that's why when people drop, okay, they get this, they get this post insulin shock, hypoglycemic shock. And even if you're measuring your blood glucose levels, that doesn't mean you're not getting hypoglycemia in certain parts of your body that aren't being measured. Okay? It's not perfect science.

And so and if you feel it, if you feel headache, eating bad and all that kind of stuff. So when you get to a ketogenic fat diet that actually spreads that out.

So one of the big benefits of that is it prevents this hypoglycemia, aspect. Because once your body switches to fat metabolism then it is happy. People think about this like most of the day you're not eating okay.

We don't eat 20 hours of 24 hour a day. Right? So your body mostly runs on stored energy. And what does your body prefer to store? Your body doesn't store glucose storage short term.

You know, it doesn't store complex carbohydrates. It stores fat. Okay. That's what your body chooses to store to eat later, okay? It chooses fat. It likes fat, it likes saturated fat.

Actually, palmitic palm oil okay, is the cleanest burning energy source of the human body. That's what your body actually makes to store for later. Okay, then it burns it later so you can think about what your body actually does.

It stores fat for use later. So it likes that. It likes to burn fat. It likes to run on fat. Okay. That's what it prefers over anything else. So yeah.

So it's a good thing when people deal with these things, but, you know, like, all things in moderation. So anyways. So yeah, so all these healthy lifestyle things are important, but they only get you so far.

Okay. Certain dietary supplements, vitamins. You know, there's certain nutritional components in our food supply. But there's a difference between nutritional vitamins and therapeutic supplementation of vitamins.

Okay. When you take AB6 or you take 100mg of, you know, a of your B vitamins, you're getting a pulse and you're getting it into your cells and getting it to where it needs to go sometimes.

So sometimes as we get older, we need these these supplements. And so I like a balanced approach. But for Alzheimer's it's this membrane cholinergic system plasma allergens.

The methyltransferase system is critically important to make sure that you have homocysteine levels low and you get good quality fat. The phosphate cooling in your diet.

And so I'm a big believer we have a lot of data on MRI. The brain can be rebuilt. Alzheimer's is not only curable okay. It is reversible and it's preventable.

It absolutely 100% categorically with no caveats. That is the truth. Okay. I've seen with my own eyes, I've seen in my own family. I've done it personally.

Okay. So it's it's doable. It's absolutely 100% doable. Okay. I we see it here clinically every day. Yeah. But it's not it doesn't come free because it's not a magical it's not magic okay.

It's it's actual systematic performance and understanding what you're trying to achieve. And you need to restore that membrane structure and function, restore that cholinergic system.

And then you have other things, you know, you change the lifestyle, the clutch, you there in the first place. And aging is aging. A lot of doctors seen, in terms of improvements when some when one of their patients gets on plasma allergens.

Well, dramatic like I get people that have that their lives are restored like we've published. Well, coming up, we presented at the Old Timers conference will be publishing it now.

It's coming out soon, but people with a late stage Alzheimer's CDR three okay. Clinical dementia rating at the maximum level, they're down to MCI level.

They're they're going from urinating in the closet to rounding, you know, being violent and being on the wandering to having a normal life up the morning, having breakfast.

Okay. They're, you know, mobility, mobility is a big deal. We get a lot of improvement in mobility. So what people see is first first is the subtle cues.

Okay. So as a scientist, okay, when we're doing clinical trials, okay. People have a hard time understanding when when I put my scientist hat on, you're all lab rats.

Okay. Like, it's it's like it's it's very selfish. It's for me. Okay? When I run a clinical trial, I run a clinical trial for me. Okay? I say, okay, what am I going I'm going to I'm going to identify my inclusion criteria.

What kind of people do I want in my trial? They have to follow these criteria okay. And then I got it. And I'm you know it's like high school. I'm going to I'm saying who has a nice dress at prom.

So I want to have my so I'm going to say, okay, this is my selection of people that I'm going to test. Right. And then I have to and there's, there's these standard tests that we have that are accurate, which is great okay.

For us. So we can compare upon ourselves, you know, you know, your memory drawing and all these kind of things that we do, psychometric tests that we do and then we use these as the common metrics for scientists to talk to other scientists about things.

Okay. But for everyday people, it's all useless crap because because it doesn't help you in your everyday life.

Ketogenic Diets and Practical Treatment Strategy

So when people talk about their real life, but they normally notice is that the vision gets better, like they get eye contact, they start seeing their loved one, their eyes get a little brighter, they get a little more engaged in conversation.

Okay? They start getting up and answering the phone that they didn't get before, or all of a sudden they're answering the door. Or they're they're they're engaging in their world.

They're engaging, okay. And then things come like they start remembering people and, and, like I give dramatic stories, like my app, for example. She couldn't she got to a point where she couldn't recognize her son, and she now she can recite everybody in her 50th wedding anniversary album.

Right now, she's walking again. Okay. And so these are things these are real, real things. They happen to people. And so plasma allergies are a critical component, okay.

And they are a big hammer. They're one of the biggest hammers we have on Earth because it really has a huge association with reduced cognition but also reduced mobility.

This is this has been in a liquid form for a long time. And I know there's a flavor kind of thing. Oh yeah. So it's also it's in a gel cap now. So a gel cap. Okay. Great.

So there's a veil and a gel cap. And how is this different. Because I know there's a cost difference between like a fish oil. Right. So fish oil okay.

So when you talk about your essential fatty acids the things that your body when I talk about membranes before I'm building all these walls, okay. You use and your body is very smart in the sense that it multi it it it uses things for multiple purposes okay.

That's one of those things. They use it for multiple purposes. It uses it for energy. You burn it into carbon dioxide and water okay. Like your body is essentially a hybrid electric car.

Like we burn hydrocarbons to charge a battery. That's a whole different conversation. But so the essential fatty acids so there's certain fatty acids your body can make your saturated.

And this omega nine oleic acid, you can technically make that in the store. There are certain fatty acids that your body cannot make. That is your linoleic acid.

Like your corn soy, you know, can we get too much of that as a general rule. But it's very critical. Still important. And then we have our or our omega three okay.

So omega six is your linoleic. Your mega three is your linolenic like flax oil. And your body uses that to make a complex long chain fatty acid called DHEA.

And that DHEA is your fish oil okay. You but your body makes your own DHEA. And what does is it's a very long molecule with a bunch of double bonds. It makes it kinky.

Okay. And so what it does, it fits in that membrane. I talk about the biological membrane. It it doesn't create it. It makes it fluid because it it breaks.

It breaks up the structure a little bit and keeps it. Yeah. And so for a while you need a high integrity wall that can decide who comes in and who goes out.

And there's you fit more. Yeah. There's there's less of a decision there. So more coming in and going out without without. Yeah. And you have different memory.

So DHEA your fish make DHEA and so do we. And so of all the animal species out there, the fish oil has high concentrations of this DHEA molecule. And so if you eat fish oil you get this DHEA.

And which is important because it's it's energetically demanding for you to make enough plasma allergens are not DHEA. Plasma allergens are that backbone okay.

They're they're what the day is attached to okay. Plasma. So so plasminogen DHEA is attached to the plasminogen backbone. And so we we actually make two types of plasma engines.

One is the de plasma. That's for membranes. That's for that switching plate concept. The other one is the omega nine. And it's designed for multiple sclerosis and autism.

Very powerful for improving sleep at night. And it's a, it's an anti-inflammatory. It's designed for that white matter, for the protective coating. It's for the signal transduction.

So people have to think about when I talk about this wiring harness concept, I also tell people, you can think of your neurological system like a radio and an old radio, right where you have the dial and you're tuning the station and the fiber that contains the signal.

Okay. That is like tuning it. So if you have like multiple sclerosis and autism, we have this. And when you have inflammation you have static, okay. When it's like static it's like the station is not tuned.

The signal is not going clean it, it's leaking out. And when you have a static the you know, if it's not moving properly, if you turn the volume down, you can kind of hear the music behind the static, okay.

But if you turn the volume up, all you hear static. So when you want your neurological system to work properly, once you get the signal tuned, then you can crank up the volume as high as you want because now you got the signal.

So the white matter okay, these omega nine your oleic acid olive oil type molecules okay. That those are performance nice tight protective coating and so that's what an omega nine plasma does.

And that's what we designed for stroke and concussion and autism and and serendipitously sleep improvement. So it's really powerful reducing neural inflammation.

And then the DHEA plasma is designed for function. It improves the neuromuscular junction in synapse function. So very very different. They're very very different.

And in fact it's not calling is the other one that we talked a lot about which you can take as a supplement. And so how is that different from cosmologists.

So fossil cooling is so it's fossil title. So it's still a regular glycerol backbone. So there's two types. So so all your fatty all your lipids in the body, you can think of your lipids, your fat like, a power strip.

Like a power strip with three plugins. Okay. You got you got power strip with three plugs. And if you plug in a fatty acid on all three, like a, if I put oleic acid, oleic acid, oleic acid, I have olive oil, okay.

And that's olive oil in my cupboard. That's called a tri acyl glycerol. So try acyl. So there's three acyl bonds okay. And that's when regular regular triglyceride is.

And then if you replace one of those three with a colon a fossil colon or fossil ethanol amine or another phosphate group, that's what creates a phospholipid.

And so you have two fatty acids. So you still have two oleic acids. And then you have this polar group called coaling okay. That's what a phosphate style choline is.

So again faster tidal choline is just like it's that's what the backbone is being attached to a classic glycerol backbone plasma. It's the backbones at three carbon backbone it's different.

It's a plasminogen backbone okay. It has an ether bond. And that's what your body has to make that you don't get from your diet. And so fossil choline provides that choline molecule and lipids.

So that's why the those fossil lipids are different. So plasma added to the plasma engines that we manufacture our plasma engine precursors okay. They're designed to enter the cells of your body so your cells can make their own plasma engines.

Okay. So it goes into the cells of your brain, into the cells of your muscles. And those cells then convert it to the final plasma. And so it's like when people have experienced Parkinson's and you take L-dopa for Parkinson's, you're not taking dopamine.

You're taking a precursor because the dope, the dope, we won't get where it's going and has side effects. But L-dopa will get into the cells and the dopaminergic cells can actually make the dopamine.

They want as many as much as they want. And so plasminogen precursors have the same kind of design. They're called alkyl acyl glycerol. And they've been around for years and years and years and years.

We've just make very pure forms of them, like old shark liver oil and those type of things. So the alkyl glycerol is

have been around a long time and lots of positive aspect.

But the problem is the, the supply of it in the environment. Like if I take shark liver oil, if you're squalene, there's a bunch of other and you can't get the actual type of plasminogen, you need.

So that's why we make pure omega three the DHA plasminogen for performance, for neurological function. That's a critical one for the ability for carriers like you need the do, because that's the reverse cholesterol transport one.

Clinical Results, Resources, and Closing Remarks

But for people with autism and MMS and sleep issues and neural inflammation, diabetic neuropathies, these the, the the omega nine, we call it proteome glia.

Is designed to calm those those it's a it's a neurological calming in protecting it improves the the protective sheath of your of your neurons. So I know our seven attendees are here are going to be really curious to learn more and also see how they can get the benefit.

So where can they learn more about you? You have a book called Breaking Alzheimer's, I have it here's three. And then you also have a company. So tell everyone where they can find out more about you and about getting cosmologists.

So the company is called Program Sciences. So program.com is where products are available blood testing certain supplements and even just general stuff.

Then educational is up. My doctor good Newcomb and there's a I put a lecture series for Alzheimer's specifically. Okay. And I call the definitive lecture series and Alzheimer's is like 12 videos and it's a lot like you got to, you know, it's like an hour each and it goes through each system goes through neurofibrillary tangles in precise detail.

Over 50 years of research of different things give you the epidemiological information word what amyloid plaques which is the issue with, Alzheimer's disease.

So issue with ApoE4 carriers so able E4 carriers have a higher propensity to get amyloid plaques. And then that and then that amyloid plaque is associated with is an association.

So I go through that in great detail what amyloid plaques are and why. Basically an E4 carrier who doesn't get increase amyloid has no increased risk of Alzheimer's.

So amyloid is a kind of a biomarker of that E4 mechanism. So I go through that brain shrinkage like mitochondrial function. So I'll go through each of these things in detail for because a lot of stuff we talk about seems, you know, fantastical, but it's not we actually have a.

Our level of knowledge of these diseases is very, very high. We know these diseases and we've known about them for many, many years. The problem is the implementation of this knowledge into the general community.

That's what and that's why I've, I've moved from being, you know, standing in a glass tower watching humans get sick and die. And so, you know, what we're doing now is we're getting more intervention.

It's like, how do we systematically intervene in a scientifically valid, precise way? Okay. And that's what we're doing now, on many levels. But yeah, you can go through that in great detail.

It will, however, help. However deep down the rabbit hole you choose to go, I'm happy to go there with you. But, Yeah, but there's that educational resource.

That's amazing. Thank you for creating that. Thank you for writing the book. And then also making the knowledge available to people so they can start implementing relatively effectively and efficiently.

Yeah. And it's, you know, you get a good doctor on your hand, you get a good naturopathic doctor or functional med doctor and, and don't, you know, don't discount conventional medicine, but you start dealing with these human people have to realize the human body is designed to work okay.

And you have to get people to get this age matching concept out of their head. It is it prevents you from it prevents the elderly people from from demanding function of their body.

Okay, you don't buy a 30 year old car said, you know what? It's okay. It doesn't need brakes. All cars don't have brakes. No, it doesn't matter how old your brakes most work, whether it's a 30 year old car or a brand new car.

Okay, your brain is supposed to work, okay? And you should ask yourself, you should look for function, okay? And it doesn't matter how old you are, things are supposed to work.

And if you have if you have the expectation of work, then you have to say, what's wrong with my brakes? For me? You know, same thing in your brain. Your body.

The, the, the logical structure of our human body is logically organized the same way everything in your life is. It just uses weird names and words and things and and drugs and so on.

But don't throw your own logic, okay? People who've gotten successful that through their lives by looking at things in a logical way, don't throw that logic out the window when you start dealing with your health, thinking, oh, I can't handle this.

No, expect it to work. And then if you expect success, you will find your way through it. Just expect more. Expect the body to heal. I love it and know there's a lot of hope out there with everything we know and everything that we're learning.

Doctor. Good. Now thank you so much for joining us. This has been I've learned so much from you, and I know our attendees have as well. And we just couldn't be more grateful for your time.

And thank you. Okay. Welcome. Cheers.