## Introduction to fasting, longevity, and Alzheimer's

Hi, everyone. This is Dr. Joseph Antoun and welcome to another. It is going to be another very impactful episode on fasting and longevity. And the angle we're going to talk about is neurodegeneration with aging, fasting and the new solutions for Alzheimer's, a new advancement in medicine.

It's it's a big pleasure to host Dr. Dale Bredesen. Many of you have heard about Dr. Bredesen. He's behind the book, The End of Alzheimer's and maybe, maybe the number one key opinion leaders, an expert in Alzheimer's and and the multi dimensional approach to the health condition in that just thinking only about the brain and Alzheimer's, but the aging process of the body and in whole Dr. Bredesen, appreciate you very much.

Appreciate your time with us today. Thank you. Joseph. Always great to talk to you. Would you would you please tell us a little bit more about yourself and your background and when and what got you today to where you are, which is you're trying to at least regress Alzheimer's?

I don't want to use the word full remission, but I'm going to talk about all this. Yeah, no, you're right. And we published the first are reversals of cognitive decline way back in 2014.

And we've had hundreds and hundreds of cases since then and published a clinical, successful clinical trial last year. So I came through a very much like you, I came through a very classical education as a neurologist and then went into the laboratory.

I was very fortunate to work for two wonderful Nobel laureates who changed the world with their discoveries. And then I started my own laboratory way back in 1989 at UCLA to study.

Why do brains degenerate? Why does neurodegeneration happen? And we spent 28 years in the lab looking at that mechanism. What is what is going on? And the big surprise, as you alluded to earlier, is that this is not a simple a protein folds the wrong way, which is what has been claimed, all these simple ideas.

## How Alzheimer's develops as a network insufficiency

It's just type 3 diabetes, it's just herpes. It's just misfolded proteins, it's just amyloid. It's just how it's just prions on and on and on. These are all part of a more complex phenomenon.

And what we discovered is that there is a network and either networks that support plasticity, support motor modulation, motor power and so forth and so on.

And what happens in these neurodegenerative conditions is that the supply and the demand get out of whack. So you have the supply going down, the demand going up.

And so these sub networks then will actually retract. And in Alzheimer's it is a network insufficiency, but there's a paradox there. It's often created by excess.

So we eat excess sugar, excess carbs, excess of all the wrong kinds of food. We develop inflammation, we develop reduced energetics, damage to mitochondria.

And now again, the supply is too low, the demand is too high. And so you get retraction. And this is very much analogous to what happened with the pandemic, where we were all told to pull back because there's insults.

Well, we have insults in our brain. So I got interested in the research, but the surprise was that the research led us very much to a network model rather than a very simple model of let's just drug one target.

And so thank you for explaining that the paradox in nutrition can you in a little bit get into more detail about first what kind of nutrition and the supplementation that the brain likes in and what And then what's the role of non eating and fasting into helping the brain with healthy aging and potentially also when you have the health condition such as Alzheimer's, you know how these interactions can help regress or reverse the condition.

Yeah, that's such a critical point. So what happens is in a perfect world, you would have enough energetics, you'd have a low enough inflammation. So we find that the two major groups of drivers in cognitive decline, and that's mainly Alzheimer's, but there are others as well, Lewy body and things like that.

The two major drivers are insufficient energetics and that is blood flow and oxygenation and mitochondrial function and ketone level and other substrates ketone glucose on the substrates that are that are useful, those are all critical.

And of course things like stress affect this as well. Then on the demand side, it is inflammation is largely it is the, especially the memory part of the innate immune system response.

And the interestingly for both COVID and for Alzheimer's, you have activation of the innate system without enough activation for the adaptive system to clear the various pathogens, which is why in COVID-19, you can die of cytokine storm.

In Alzheimer's, you die of cytokine drizzle. It's going on for many, many years, but it's the same idea. So those are the two keys. And then the paradox arises because we are evolutionarily designed to have a diet that gives us appropriate protein, appropriate fats, appropriate energy without too much inflammation, inappropriate, of course, minerals, oils and vitamins and things like that.

The problem is for most of us, we are deficient in multiple things. As you know, we're deficient in zinc, we're deficient in magnesium, we're deficient in potassium, we're deficient in choline, we're deficient in iodine.

Often these are all critical in of course, vitamin D is another big one. So all of these things are critical to keep that plasticity network working. Now, what happens because of the processed food movement largely and because of depletion in the soils is another important point.

## Nutrition, insulin resistance, and ketones

But largely as professor Rob Lustig has pointed out in his wonderful book, Metabolical, We are eating some. We're eating a diet that is actually more poisonous than it is nutritious.

And so what happens? Number one, we get insulin resistance, very common. There are over 80 million Americans who have insulin resistance, many of whom have metabolic syndrome.

So what happens when you get insulin resistance? This is one of the big risk factors for Alzheimer's by the way. And two things happen. Number one, you create a situation in which you have glycated proteins.

As you know, we measure it as hemoglobin A1C, but that's representative of hundreds and hundreds of proteins that are non enzymatic glycated So it's a little bit like having rewards on a shark.

You change the shape and you change the function of these proteins. They're not as working as well and they are now pro-inflammatory then secondly, you're changing your energetics because you aren't.

You don't have the appropriate support because of the fact that you've now got this insulin resistance. So now when you are taking, for example, glucose for a critical substrate, it's it is not functioning appropriately because you're insulin receptor signaling is actually modified.

And in fact, the signaling molecule IRS1 changes its phosphor relation from a tyrosine type phosphorylation, which is a positive saying yes, you know, you've eaten glucose, you're now going to metabolize this to a serine and

threonine, which is which is saying shut things down, shut things down.

We've just got too much insulin here. It is literally an insulin resistance state. And by the way, when you do a PET scan on an Alzheimer's patient, that's the signature of Alzheimer's reduction in glucose utilization in the temporal and parietal regions.

So it's showing you that, yes, your metabolism in that area is down. So therefore, when we see people who have cognitive decline, I consider that an emergency.

These are people who are not functioning normally. For most of us, we can go back and forth with metabolic flexibility between glucose and ketones. However, when you begin to have cognitive decline and this can happen many years before you have a diagnosis, you lose both of those.

You lose the ability to metabolize glucose because of your insulin resistance. But because of this constantly high insulin level, you prevent your body from making ketones.

So now the brain is literally starving for this support. Now, as you indicated, there's kind of a surprise. One of the ways that you're now helping this is to include fasting.

Why would you fast when the problem is that you don't have enough? Well, it's because you need to replace that insulin sensitivity. So that's why you've got to be very careful at the beginning.

And in just as you're you're and my friend and colleague Valter Longo points out, you've got to be very careful with people who are frail. So what we see is when people have some extra weight, when they have a high BMI, when they've got some extra adipose, they do very well at the beginning because we're getting them back to being insulin sensitive again.

But when they're frail, we have to give them exogenous ketones early on. In fact, we typically give everybody exogenous ketones early on, but we're very careful with the fasting at the beginning.

So the recommendation is if you come in and you're overweight, you want to start with a fasting mimicking diet, sort of thing, and then you want to roll after that.

You want to roll into ketone flex 12 three, which is a plant rich, mildly ketogenic diet which has gotten the best results. So far in terms of actually improving cognition.

On the other hand, if you come in and you're frail, you've got a, you know, a BMI of 17 or 18, you have to be careful. You got to work up to any of that fasting.

Start with some exogenous ketones. Don't fast yet and now get yourself into slowly over a month or two you get into an indigenous ketosis. And again, this is what's giving, it's bridging that gap.

So as Professor Stephen Kidane from Canada has shown, there's a gap between what you need for a functional brain and what you have when you have cognitive decline.

So ketones can help to bridge that gap. Then making people insulin sensitive helps also to bridge that gap. Then there are supplements that we're using, etc.

We want to get your neurotransmitters up. We want to make sure your acetylcholine is high enough, your dopamine is high enough. We want to make sure your mitochondrial function is there.

We want to make sure that you haven't drop your oxygenation. One of the most common contributors to cognitive decline, as you know, is nocturnal hypoxia, which can happen either with sleep apnea or upper airway resistance syndrome or other airway issues.

So I'm looking at all these pieces and we initially identified 36. We know of a few more now, but it's dozens. The good news is it's not thousands. We can now for each person determine why they are at risk or actually having cognitive decline.

And we can address those things. And that has given us the best outcomes in history. And I mean, this is this is fascinating is the first time we're talking about a multi dimensional approach to the essence of the disease, not as symptom or, you know, one pill approach or one, you know, intervention approach.

Do you want to compare the solution that you're suggesting? Can you look in detail it in the practical words, say somebody listening here today to this episode and they have mild cognitive impairments or they have a family risk of Alzheimer's or they have Alzheimer's.

## Personalized treatment and early evaluation

What do you recommend that they do and how that compares to typically today, if you go to your neurologist, what what happens there as well? Yeah, that is such a crucial point because if you go in today, it is barbaric.

As you know, you'll have very few labs. You'll look at a couple of things like your thyroid status, your B12 status, and then the person will write you a prescription.

Typically for Aricept or Namenda, they may give you this antibody that's trying to suck out the amyloid, which makes no sense in terms of what's actually driven the process.

And they'll tell you that, you know, you're going to die. There's been no real help with this disease, whereas what we're saying is completely different.

What we're saying is you're going to go in and get a deep evaluation that's going to look at all these different things. Do you have various toxin exposures?

Do you have various pathogen exposures? Again, there are things and it's typically we find 10 to 15 different contributors that contribute to reduced energetics and or increased inflammation.

So we are looking at your status with respect to sleep apnea. We're looking at your toxin exposure, and that is in organics like air pollution and Mercury Organics, like toluene, benzene, glyphosate, formaldehyde.

And then also it's bio toxins, things like trigger things, scenes, okra, toxin. Interestingly, all of these things can contribute to demanding more of your brain and reducing the energetics.

And then we're going to look at your metabolic very carefully. Where do you stand? Are you are you already insulin resistant, as so many people are? Are you already pre-diabetic or are you already even type two diabetic?

Unfortunately, what we're finding is then what's been reported is that the diagnosis of Alzheimer's is typically made 20 years after the pathophysiology begins in the brain, and that's shown by pet scanning and by spinal fluid.

How would you. Rate this where maybe fasting early on can help mitigate most of the factors you mentioned, whether it's inflammation, whether it's rejuvenating, the function of the cell, the lysis of the matrix.

Andrea, and all of it it to help the body age gracefully, but also reestablish the balance that you're talking about within the brain. Absolutely. And of course, you know, as you mentioned, it has effects on inflammation.

It also has effects on insulin sensitivity, which is wonderful, also helps longevity. So all of these things are critical. But again, you don't want to become frail.

So you want to, you know, make sure that you keep up your appropriate body weight and your appropriate health that that's you know, that's all critical to the outcomes.

And by the way, it also improves your blood pressure and your lipid profile. And one of the common contributors to cognitive decline is hypertension. We find that when people go again, they go on the appropriate diet, they do go on the appropriate nutrition, the appropriate protocol to improve their metabolism, their toxin exposure, their their any chronic pathogens, etc., their blood pressure is typically normalized.

We typically see people getting off their antihypertensives, getting off their statins and getting off their anti diabetes drugs. And I think many people are seeing that diabetes is something that can be controlled metabolically.

You don't need to start taking these drugs that can have very unfortunate side effects, as you know. So what it looks like is a deep dove into what's causing the problem and then a precision medicine type, personalized protocol.

And we published this last year where 84% of the people actually got better. And then the third piece is get in as early as possible. And so you go through four stages.

When you develop dementia associated with Alzheimer's, you have an asymptomatic stage, you have subjective cognitive impairment, which lasts on average ten years, where you know something's not quite right, but you're still able to score normally on a cognitive tests.

Ultimately, then you got MCI mild cognitive impairment, which shouldn't be called MCI because it's a relatively late stage. It's like telling someone, don't worry, you've only got mild, mildly metastatic cancer. It's a late stage of the problem.

And then the fourth and final stage, of course, is dementia, where you have trouble with your activities of daily living. So we recommend anyone who's 40 years of age or older, please get evaluated, get a cognitive copy is some simple things to do.

And I have to say, you know, it's much more pleasant than a colonoscopy, easy to do some blood tests and some and a simple online cognitive assessment to get you started in the right direction.

Where they can do that, where they can go and do this. Yeah, you can do it. Just look at my cognizance copy. Or you could look at a CQ test. So see and then little Q test, which is a CQ test is a free test so that you can see how to get started.

We aware where are you? Are you already having some cognitive decline? You know, want to. Joseph One of the concerns is people often will say, well, I think I'm here for prevention, but I think I'm maybe just having a little issue just because of my age.

It's normal for your age. Well, when they then get checked out, it turns out they've already started. This does sneak up on you. They started down the pathway already and so you want to really get on there.

The biggest problem is that people wait and wait and wait. And often their doctors say, well, look, there's not much we have to offer, so just let's wait till next year.

And that's the opposite of what you want to do. You want to start early? Yeah. And what's important is their biological age and how they're functioning from the inside.

It doesn't matter what's the age. And I'm looking at you and me here. I don't know what's your exact age, but you look really, really young. And this is important for everyone listening.

Thank you. I'm seven on 71. Here you go. I'm an old guy. You can easily go for a 45 year old young gentleman. I think hardly. But interestingly, I've not it's been surprising to me.

I haven't I haven't turned gray yet. I'm kind of waiting for that. And I wanted to ask you, like, what is your daily routine personally? What do you do? What do you take a supplements?

What do you do throughout the day? How you eat, how you fast? We can you tell us what's your personal? Yeah, sure. And you know, I'm sure my my personal, you know, isn't perfect.

You know, as with all of us, I'm trying to learn better because I spent most of my life like everybody else, going to medical conferences where if you want someone to come, you always put out cookies or pizza, you know?

And so it's just learning a lot is that I've actually learned a lot from my wife, Aida. We're trying to change those two fast bars and fasting instead of you go exactly.

That way to go. So I do think wearables are going to help all of us because you know what the big change medicine of the 20th century was?

## Prevention for those with family risk

Wait for symptoms, get them treated. Those are acute illnesses like pneumococcal pneumonia. The medicine of the 21st century is complex chronic illnesses, Alzheimer's, cardiovascular disease, cancer, things like that.

By the time you get symptoms, it's relatively late stage. So what you want to do then? That's where the wearables are so helpful. You see, where am I with my heart rate variability?

So I have my Apple Watch here. And so what I try to do each day is close the three rings, get enough hours of standing, enough hours of exercise, you know, enough movement that that will close the ring and get me out there.

So I typically do some exercise in the morning, then I do a hike typically in the afternoon and then a little bit of exercise, but not too late in the day.

I try to eat mostly a plant rich. And I have to say today is a bad day because I didn't do as well as usual. But typically I use Aikido Flex 12 three type of diet, a plant rich, mildly ketogenic diet salads, things like that, often with some with some low mercury fish, smash fish, you know, salmon mac, mackerel, anchovies, sardines or herrings.

Typically, we have some some salmon and canned salmon is one way to go again. Low mercury. You want it to be wild, caught, not farmed. And so then I can check and see.

One of the things I found early is that I was not getting enough choline as so many Americans are not. You want to be up there in the 450 to 550 milligrams per day?

I was down with like a typical American 300 to 350 per day. So I typically will supplement that a little or simply try to have a little more get it from eggs, you can get it from liver, things like that.

And so I try to do that. The seven foundational things we call it, the B seven, the basic seven things which are appropriate nutrition, and that is a fasting period.

As you mentioned, fasting is so helpful. We typically do go for 12 to 16 hours at night. We usually recommend if you're able we for positive and that's a quarter of the population you want to be more on the 14 to 16 hours if you're able for negative which I am I want to be more on the 12 to 14 hours.

So I typically try to get in there and I can find my eating to about 8 hours a day at the most ten. So I do get a 14 hour or so fast in there at night.

And so then so it's diet, exercise, sleep, stress with sleep. I check my oxygenation while I'm sleeping. I have had some issues in the past with some mild sleep apnea, so I try to make sure that my oxygenation stays good at night.

I often use a mouthpiece, not always, and then try to be more on my side than on my back. You know, try to make sure I don't have any issues there. Stress, you know, stress has been one I think we all deal with.

And I definitely had some big issues with that, you know, staying up to late one hour of sleep, 2 hours of sleep and that sort of thing. So what I try to do now is try to do, you know, do some deep breathing, follow my heart rate variability.

You know, when stress is heavy, it's going to be ten or 20 when, you know, when I can minimize it, when I just do some deep breathing, for example, it'll go up to 120, 140, you know, it'll go up dramatically.

So again, it's been a great way to follow it and see where thing you can. You can basically see problems before they arise and then, you know, brain training related things.

So it's diet, exercise, sleep stress, brain training, targeted supplements and detox. And so for brain training, I'm typically working on the next paper.

So we just finished a very exciting paper looking at people ten years after they started our protocol and people who have sustained improvement in their brains, which is unheard of, as you know, if you usually if you get an improvement, you go right back down to declining.

These are people where we actually found what was causing it. We addressed those and they stayed improved. Now, interestingly, many of them will start after five or six years, a little decline.

Okay, we then reevaluate. We find what's causing the problem and they go right back up again. So it shows you that these are the drivers of cognitive decline.

And then for supplements, I typically take some for energetic, so I typically take either nicotinamide, Riboside, MMN or just Niacinamide. Those are all good.

I take some omega threes and then I usually will take resolves for a month or so just to help any ongoing inflammation. But I don't take them chronically and then some vitamin D to keep my vitamin D level up.

And of course get outside as much as possible. And then for detox, I typically will take some acetyl GUDA thiamin or some NAC, either one of those. So those are the sort of basics that I think are very, very helpful.

And I also do take some natto kinase because I think that's turned out for so many of us. In my LP, little AA was high, which essentially you're going to offset that to some extent with natto, kinase and technological.

So I take natto kinase each day as well. Well, thank you very much for sharing that. If if I'm if I have somebody in the family that is struggling with Alzheimer's.

Yes. I'm a 40 year old in watching the summit. I don't have we talked a lot about if I already have the condition, but say I'm a 40 year old, really concerned my mom has Alzheimer's or my dad has Alzheimer's.

I may have the genetic predisposition. What do you think I should do today to kind of help delay the onset or mitigate the progression towards it? This is such an important point, you know, Joseph, and it's the thing that people have gotten wrong when you go to a nursing home or an assisted living facility and you have someone there, those people, though, the people running it should be talking to you. Wait a minute.

Bring in everybody in the family. Let's make sure that we end this problem with this generation. That is the way things should be. So everybody who's 40 or over should get on active prevention, and especially, as you indicated, those who actually have it in their family.

Find out what is your APO status? Are you in a high risk group? Are you in a lower risk group? Find out what is your status with respect to ongoing inflammation.

Do you have metabolic syndrome? You can have these things going on for years, not know it. And you are now incubating Alzheimer's and basically you're going to you're heading for Alzheimer's.

So find out your status with respect to your metabolism, your inflammation, your toxins, your vascular status, find out your APO. B, that's an inexpensive test.

Very helpful for knowing, you know, where you stand. Also, you know, recognize what's your status with respect to previous head injury, another common contributor, if you are going to be going for some anesthesia, you should get your glutathione up ahead of time.

You should talk to your anesthesiologist ahead of time. Don't bring the blood pressure down too low during that. That can hurt. Don't let the oxygenation come down too much.

That can hurt. And then when you come out of there and if you can do it without general anesthesia, that's even better.

## Daily routine, supplements, and lifestyle

But if you have to have general, when you come out of there, you want to get your vitamin C, your glutathione on all of these things to help you detox what was there.

Because unfortunately, anesthesia has multiple contributors. And one of the most common stories we hear and I heard it again yesterday, someone who is elderly had anesthesia and they never were quite the same after that.

And that was the beginning of their cognitive decline. So it definitely offers contributions. So the bottom line is, here's the key, Joseph. Alzheimer's is now optional.

Nobody should get this disease. The problem is because people haven't understood it, because they wait too long and because they try to treat it without addressing the things that are causing it, if everybody would simply adhere to those basics, there would be very little Alzheimer's and which is way it should be.

We should be able to end this with this generation. And I tell my daughters, you know, they're in the first generation that really doesn't have to fear Alzheimer's.

For my advanced years, my generation, it was the biggest health concern that we had because who wants to lose their mind? So now nobody should get this, get evaluated, get on active prevention or earliest treatment, and you won't have to worry about dementia associated with Alzheimer's.

Just as with diabetes, we went to understanding pre-diabetes and then insulin resistance and and you can really start early on and never get diabetes.

The same thing is now happening with Alzheimer's disease. It's just that most practitioners don't understand that. So we recommend something called pre-code, which is prevention of cognitive decline or recall, which is reversal of cognitive decline.

But for anyone where it's in the family and there's a concern, I would go with Recode because it gives you more testing and looks at all the things you're going to save.

90% of of the money you would spend on the other end for a nursing home. The average American, unfortunately, spends $350,000 on Alzheimer's before they die of Alzheimer's, and that's mostly nursing home costs and things like that and care at home and things like that.

You can avoid 90% of that by getting on active prevention and doing things early on. Sometimes it's tough. You will find that you have a chronic pathogen.

One recent person who had had some secondary decline turned out to have I have a Bartonella, which is a tick borne illness which just hadn't been diagnosed.

These things, as you know, can rumble along for decades, giving you problems, giving you ongoing inflammation, and then you end up having some cognitive decline.

You have to treat those early, eradicate them, and then you really lower your risk dramatically. Well, that's that's that's amazing because we've kind of both experts like us coming from medicine and patients, we kind of learned and learned helplessness by when we thought that this is oh, it's a genetic predisposition, it's a disease of aging.

So if I'm unlucky and I'll get it, I'll get it. And what you're saying and what the new science is showing, it's it's correlated with so many factors that are some of them life.

So some of them could be prevented, some of them could be ameliorated, some of them could be treated, some of them could be supplemented. And all what we need to do is to be proactive and understand better the disease, understand our risk, factor our lifestyle, and try to intervene as early as possible.

I don't know if you when when you and I were training and obviously you're much younger than I am, but when we when certainly when I was training, one of the common things that people said to the doctors outside the room would say, well, what are we going to say to this patient?

And they would say, hang crap. Know I don't know if you remember that term, but hang Crate Med things are going to go badly and you just have to give them no hope and just say, you know, things are not good, we're doing the best we can, but don't expect and that's what it's been for Alzheimer's forever and now for all these other neurodegenerative diseases.

So we are now creating the first precision medicine program that will allow people to have hope with all these, whether it's ALS, whether it's macular degeneration, Lewy body disease, frontotemporal, what have you, because these all seem to be these network insufficiencies with just being different sub networks.

So it just kills me, this idea of hang crate, there's nothing we can do. Let's get the crape off the walls. Let's now, let's now hang, you know, happiness, big smiley faces and keep on working with people to prevent decline and to reverse decline, because we can now do that.

And this is phenomenal. I bet everyone watching here saying, okay, where can I read more? How can I start? where to go next? You mentioned a lot of supplements, a lot of recode and decode and a lot of advice.

So if I want to go and read more and learn more, I know where to start. What would you recommend I do? Yeah, thanks for asking because lots of good sources.

So number one, you can go to drbredesen.com, so that'll that'll get you to the various places. There you can go mycognoscopy.com which just keeps C-O-G-N-O-S-C-O-P-Y just so that it will give you here are the tests to go get.

You can actually do this now without even a physician. You can get appropriate physician sign off to do these tests. It will generate a report that tells you here are all your risk factors and it'll also show you where are doctors who've been trained.

We've trained over 2000 physicians in ten different countries and all over the U. S. And then you can read this in three different books. One is called The End of Alzheimer's, which was New York Times bestseller for five months.

Is it ten? It's now over in 33 different languages, then the end of Alzheimer's program, which gives you more details about all the different things to do.

And then the third one is called The First Survivors of Alzheimer's. And that's seven stories written by people who themselves improved. And I wanted the people who had improved to get the word out to people that this is not hopeless, there is something to be done.

And please hang in there. Work with your practitioner, work with your health coach. Health coaches have been really helpful to get people on your on to the right approach.

And of course, your group with nutrition for longevity has been huge in getting the appropriate nutrition for people who have various things, including Alzheimer's disease, heart disease, cancers, things like that, where it turns out that having the right nutritional approach may be hard on your own to go and pick out all the right things from all the right places.

I mean, a lot of people had complained to me about that in the past. How do I do this? You're telling me plant rich, mildly ketogenic diet, you know, wild codfish, pastured eggs, grass fed beef.

Where do you get all this stuff? Well, you get it from in from N for L very easy nutrition for longevity can actually provide these we've got hundreds of people now who are who are doing this with really good results and find out where you stand on your ketones.

## Resources, books, and closing remarks

You can do it with a simple breathalyzer and make sure that you are metabolically flexible. So there's really a tremendous amount we can all do. You can also follow me on Facebook if you want to do that or Instagram.

Dr. Dale Bredesen. So lots of ways to get more information. And the reality is all of us should make sure that we are going to keep our cognition optimal and that we are not going to be subject to cognitive decline.

We don't have to roll the dice, as you were saying earlier. We don't have to just sit here and wait for it to come and think, well, maybe I'll get it.

Maybe I won't. We really have for the first time the ability to make sure that virtually nobody suffers cognitive decline. And this is very appreciative.

I think this was a session that's going to change a lot of people's life. Thank you for directing them. Where to read. Thank you for directing them, where to supplement and where to eat.

And and, you know, they'll probably reach out further and further. We've had a very we've had an amazing partnership with you. You kindly ask us if we can throw in nutrition for longevity.

And you can patients can go to nutritionforlongevity.com if we can supplement people with their with the food that you mentioned, we're seeing amazing success with it.

So this is pretty amazing, pretty rewarding the same thing is happening with us on the diabetes reversal. And this is the movement that we're all starting in here is lifestyle, nutrition, stress, sleep, healthy, aging.

As you mentioned, the B7, I might add, I might add an eighth one, which is happiness and social capital. That's that's critical for the brain and well-being.

No question. This is the way we want medicine to move forward and this is what we're preaching today. Thank you very, very much for your time today. And I think we're going to see you again pretty soon, and especially after the first stories and the recent papers about sustaining the remission from Alzheimer's.

Appreciate you very much. Great to talk to you always, Joseph. Thank you.