



ALZHEIMER'S

THE SCIENCE OF PREVENTION

Episode 4: How To Change Your Brain For The Better



- David Perlmutter, MD: We're all made up of an incredible life code, called our DNA. DNA makes up our genes, and our genes help determine the story of our lives. But while genes play a major role in determining how we look, how we feel, and how we experience the world around us, we now understand that how our genes express themselves is far more dynamic than we once appreciated.
- David Perlmutter, MD: We can actually see that while our genes influence the way we live our lives, the choices we make also impact the way we use our genetic material. This beautiful dance is influenced by every decision we make. In addition to this powerful idea, we also understand that our genes developed over millions of years, to suit our ancestors needs for survival.
- David Perlmutter, MD: But the message that the modern world is delivering to our DNA is vastly different from what it used to be. In a sense, most of us are living at odds with our genetic makeup, and we see that the information that we now deliver to our DNA can create major health problems.
- David Perlmutter, MD: Luckily, when we consider these two concepts in tandem, a powerful idea is indeed formed. If we understand how our modern world may be altering the messages that we send to our DNA, we can take the necessary steps to make sure we're giving our genes the right message. And since we can change the way our DNA is expressed, we can have an empowering opportunity to change our health for the better, no matter what stage in life we are in.
- David Perlmutter, MD: Now in this episode, we're going to learn what genes are and the role that they play in Alzheimer's disease. We will explore the idea that our genes are not our destiny, and how we can actually influence our genetic expression through a process called epigenetics.
- David Perlmutter, MD: We will also learn about the empowering ability to grow new brain cells, through the process of neurogenesis. And last but certainly not least, we're going to learn that our brains are capable of creating new connections and that this occurs throughout our lifetimes through a fascinating process called neuroplasticity.
- David Perlmutter, MD: Yes, we actually can improve our gene expression, grow new neurons in our brains, and rewire the connections in our brains,



as well. These are some of the most fundamental and cutting edge tools that you have in your Alzheimer's prevention toolkit.

David Perlmutter, MD:

I'm Doctor David Perlmutter, and this is Alzheimer's - The Science of Prevention.

David Perlmutter, MD:

In previous episodes we learned that not only is Alzheimer's becoming far more common, but unfortunately and far more importantly, it is a disease for which we have no meaningful treatment. This makes prevention all the more important.

David Perlmutter, MD:

We've touched on some of the important tools available to us in an Alzheimer's prevention plan, including an appropriate diet, exercise, avoiding environmental toxins, optimal sleep, and keeping blood sugars in check to avoid type II diabetes.

David Perlmutter, MD:

All of these components have powerful effects on our genes and actually modify the way that they are expressed.

David Perlmutter, MD:

Let's learn more about this phenomenon, which is called epigenetics.

Jeffrey Bland, PhD:

Our genes are not locked in to produce exactly an outcome called us. Our genes are there as a potential for which our lifestyles, our environment, our experiences, then create a different expression pattern of our genes that become us. So there's much more plasticity in our ability to be, look, act and feel differently based upon how we actually put ourselves through different environments. How we eat, how we think, how we act, how we move, who we interact with.

Jeffrey Bland, PhD:

All those things are signals that our genes pick up and then create an outcome called who we are, our phenotype. And that concept of this gene environment interaction, giving rise to who we are - to me is a dominant new conceptualization, that gives much more opportunity for making positive change. And not just saying what was us, that we got the bad luck or the bad genes, and that there's nothing we can do about it. That's an old model that is now really being replaced by this new model of genetic plasticity. So that's to me where the personalized lifestyle becomes important because now we say, "Hey, we can own much more about ourselves than we thought before, and now what we have to know is what do we do to get the most out of our genes?" And that's the new 21st century kind of paradigm.



- Dominic D'Agostino, PhD: Genes are not our destiny. They are constantly being altered in different ways. Various nutritional regimens can change how genes are activated or deactivated through methylation or demethylation, through molecules called histone deacetylase inhibitors.
- David Perlmutter, MD: Since decoding the entire human genome more than 15 years ago, we've learned a lot about how our genes influence our health outcomes.
- David Perlmutter, MD: And in the mid 1990's we discovered a so-called Alzheimer's gene. More specifically, we found that a particular variant of a gene was linked to an increased risk of developing Alzheimer's disease.
- David Perlmutter, MD: This gene is called APOE. And we each have two copies of the APOE gene. There are many types of APOE genes and we inherit one copy of these genes from each of our parents.
- David Perlmutter, MD: Researchers have found that those who end up with either one or two copies of this gene, the so-called APOE-4 allele, have a much higher risk of developing Alzheimer's. They have inherited the so-called Alzheimer's gene.
- David Perlmutter, MD: And here's why this information really matters. Inheriting the APOE-4 allele is a risk marker for Alzheimer's disease, not a determinate. That means that while an individual may have inherited this gene, it doesn't necessarily mean that Alzheimer's is in his or her future.
- David Perlmutter, MD: Lifestyle changes can absolutely offset the risk imparted by inheriting the so-called Alzheimer's gene.
- David Perlmutter, MD: So what can we say to people who carry what's called the Alzheimer's gene, in terms of what they should be doing?
- Jeffrey Bland, PhD: First of all, I don't think there's such a thing as an Alzheimer's gene. But I believe that there is actually not a gene for any disease. I think what our genes do is determine our function based upon a certain environment. And what we do is we stigmatize individuals by telling them that they have a gene for a disease.
- Jeffrey Bland, PhD: So I'm very much against what I call a form of genetic discrimination, because once a person feels stigmatized that

they got the bad luck of the draw with the gene, it can be very discouraging, you can actually have a person not have a positive attribution about what they're gonna do. They might pull in and just live off of a fear model. So I think my view is an APOE e4 is an information bit in a person's genetic heritage to tell them and instruct them maybe how they should best lead their lives.

David Perlmutter, MD:

So APOE-4 is not a determinant?

Jeffrey Bland, PhD:

That's what I would say. And in fact, if it was as many people feel a sure thing that you're gonna get Alzheimer's because your APOE e4, it just doesn't match up with statistics. When you look at actually the penetrance of APOE e4 into Alzheimer's, it's less than 50%. So there's a big room for other stuff going on that is modifiable.

David Perlmutter, MD:

As we're talking about Alzheimer's prevention, some might think that, "Well, it's a genetic problem. If I have the gene, I'm basically in trouble. If I don't, I'm going to get off scot free." Can you address that?

Dale Bredeesen, MD:

This is a really good point, because there's clearly a genetic component, because people, when it's running in your family, you have an increased likelihood of getting it. When it's not running in your family, it's not zero. You're still at risk, but you're not as great a risk. About five percent of overall cases have a strong genetic component.

Dale Bredeesen, MD:

For the others, the typical case, so 95 plus percent, and for about two thirds of these, they are APOE4 positive, and about one third are APOE4 negative. But, this does not mean that the genes are your fate. In fact, you can have dramatic impact on how these genes are read out, so called epigenetic mechanisms.

Dale Bredeesen, MD:

In fact in this case, you can do a lot. The reality is that we can, with what we know today, make Alzheimer's Disease a rare disease. It should literally be nearly ending, virtually ending with the current generation. Just as we went through scourges of leprosy, scourges of syphilis, scourges of polio, the current scourge of Alzheimer's should be ending.

David Perlmutter, MD:

We do know that there are some genes that increase risk for Alzheimer's, but what exactly does that mean?

Mark Hyman, MD:

Well, we have a very new understanding of genes than when you and I went to medical school, we know that genes are not

fixed. You can change the expression of those genes, what's turned on or off. Yes you get genes from your mom and your dad and whatever genes you've got you can't change, but you can change which genes are turned on or off if you're expressing disease or expressing health. And I had, remember a patient who is APOE double 4 that's the highest risk for Alzheimer's gene. And she was 90 plus years old. She was a health nut her whole life. She exercised, she ate clean diet and she kept her normal wage. She didn't smoke, she didn't drink, she took care of herself and she was 90 plus years old, cognitively completely intact and was still working as a dentist at 90 years old.

Mark Hyman, MD:

So because you have the gene doesn't mean you're going to get the problem. It means you have to pay attention more carefully to what you do, to what you eat, how much you exercise, how you sleep, your stress levels, your nutritional status, exposure to toxins. All those things have to be looked at. But you can modify your risk. And it's not a death sentence.

David Perlmutter, MD:

There are plenty of people who don't have the so- called Alzheimer's gene, the APOE4 what would you tell them?

Mark Hyman, MD:

I would tell them that they also have to focus on taking care of their brain because many people get Alzheimer's and dementia and they don't have the APOE4 gene, so you still have to take care of your brain.

David Perlmutter, MD:

Popular these days are home gene testing. How should people interpret that information in terms of Alzheimer's risk, which could be somewhat actionable?

Mark Hyman, MD:

I think home gene testing is a double edged sword. It can provide you lots of useful information that can be actionable. It can provide novelty information. What your ancestry was, are your risks of different conditions. Some tests do show the risk of Alzheimer's which can be terrifying for people if they got a positive result. So I think without proper counseling and advice, it's not a great idea to learn from some home tests that you're at risk for Alzheimer's. You really want to get professional help to understand one, what it means, two what your risk is and three, what you can do about it. Because most of the advice out there is that there's nothing you can do about it.

David Perlmutter, MD:

The idea that our day to day lifestyle choices have a profound effect on the expression of our genes is really empowering.



- David Perlmutter, MD: We now know that, for example, the food choices we make, the stress we experience or avoid, the exercise we get, or neglect. The quality of our sleep and even the relationships we choose, actually choreograph to a significant degree, which of our genes are active and which remain suppressed.
- David Perlmutter, MD: And here's what is most compelling. We can change the expression of more than 90% of the genes that have a direct bearing on our health and longevity.
- David Perlmutter, MD: And in addition to epigenetics, another amazing tool we possess is the ability to grow new brain cells, a process called neurogenesis. Neuro, as in neurons, which are brain cells. And genesis, as in, new beginning. So much about the human body is regenerative.
- David Perlmutter, MD: For example, certain blood cells turn over every few hours. Taste bud receptor cells get replaced every ten days, skin cells turn over every month, and muscle cells take about 15 years, but nonetheless, they get to completely renew themselves.
- David Perlmutter, MD: Even the cells of the heart muscle experience regeneration. If you reach the age of, say, 80, your heart will have renewed itself completely four times.
- David Perlmutter, MD: So regeneration is a common theme throughout the body, and this applies to some very specific parts of the brain as well.
- Max Lugavere: Neurogenesis is the birth of new brain cells, the creation of new brain cells. This was considered an impossibility until the mid '90s. Doctors and scientists had previously thought that the brain had reached its peak in about the mid '20s, only to begin a low and slow gradual decline towards the end of life. But we now know that in some of the brain's most vulnerable areas like the hippocampus, the dentate gyrus area of the hippocampus, we can actually grow new brain cells up until death.
- David Perlmutter, MD: It was pretty much dogma over the years that we didn't have the ability to grow new brain cells. And yet now we know that we do, it's called neurogenesis. Why is that important and what can we do to actually affect that?
- Mark Hyman, MD: Well, this is one of the most exciting discoveries in medicine that even to the point of death, you're making new brain cells. So what are the implications of that? The implications are that if



your brain is damaged, you can repair your brain, you can make new brain cells, you can increase the connections of brain cells. This is called neurogenesis and neuroplasticity. And understanding how to do that and understanding what inhibits that is the secret to creating a healthy brain and to preventing treating and even reversing Alzheimer's.

David Perlmutter, MD:

It's really been relatively recently that we've learned that the brain has the ability to grow new brain cells. What can we do to actually enhance that process?

Jeffrey Bland, PhD:

The regeneration of the brain is an unbelievable breakthrough discovery. In my schooling when I thought I was educated by top mentors, skilled in the art, and I learned my neuroanatomy and neurophysiology, and this would've been the 60s, the 1960s, that it was well respected by the body politic in medicine that the brain didn't regenerate. That we used to make jokes actually saying, "Oh gee, you went on a Friday night, and you had a few too many beers, and you're lost some brain cells. You're never gonna get those back," you know? And this concept of irreversibility of neurons once they died.

Jeffrey Bland, PhD:

And so I think that, we carried forward this view that the brain was one of the only tissues of the body that somehow had no regenerative capability. All other tissues, including bone would remodel themselves. Sometimes it would take a long time, but the brain no, it's a one way street. So when suddenly it was found that no, the brain actually in adult animals can regenerate itself after injury, and we saw this with alcoholic encephalopathy, which was considered irreversible from brain injury from alcohol in adults, that no there was some regeneration if you really got over the alcohol abuse problem... you could actually see using scanning technologies, increased nerve regeneration in the brain or neurological regeneration.

Jeffrey Bland, PhD:

So that was really empowering for so many of the field of neurologists like yourself that said, "Well, here the brain has a recuperative property or ability."

David Perlmutter, MD:

This revelation, that neurogenesis occurs in humans throughout our lifetimes, has provided neuroscientists around the world with the hope that we may be able to stop, reverse, or even cure progressive brain disease.

David Perlmutter, MD:

In addition to our ability to change our gene expression, and our ability to grow new neurons, we also have the ability to actually

rewire our brains. And this occurs throughout our lifetimes. This process is called neuroplasticity.

David Perlmutter, MD:

Neuro, as in, neurons, the brain cells, and plasticity, as in plastic, pliable, moveable, changeable. Let's explore these concepts more fully.

David Perlmutter, MD:

People have called you the father of neuroplasticity, which I think is a great name to own. That said, how does this whole notion of the brain being able to rewire itself build new pathways? How does that relate to a degenerative condition like Alzheimer's?

Michael Merzenich, PhD:

Well, actually, we have it within our power at any point in life to improve the operational status of our brain. In the normal course of a life, there's an early period, you could say, of growth and progression and advance and we come to some peak performance period, roughly in the third decade of our life, in the average life. And then everything begins to slide downhill. It doesn't have to happen because the brain is continuously plastic. We actually have the power within us to continue that growth. We have the power within us certainly to argue strongly in ways that would increase the resilience of our neurological machinery, you could say, to keep us safer for a longer period of time.

Michael Merzenich, PhD:

So, absolutely, we realized, almost from the outset that we had the potential to change our neurology in a way that should be protective, that should keep us safer for longer.

Max Lugavere:

Neuroplasticity is important. It's basically the brain's capacity to change, which is enabled by neurogenesis and all the factors that allow that to occur. In Alzheimer's disease and in depression as well, there is reduced neuroplasticity. So that might be an effect of the disease as opposed to a cause, and so far as we can encourage neuroplasticity, it's well documented that we can encourage it with exercise, with eating a brain healthy diet. I think it's definitely something that we should be mindful of and chase in our diets and lifestyles as best we can.

Ayesha Sherzai, MD:

The brain is plastic. You build its capacity by challenging yourself and by living a healthier life. So we all know that you can actually even increase your IQ points by challenging yourself. You can actually be faster in your processing speed. You can be better when it comes to visual spatially. You can have better judgment, better reasoning, better planning, better memory,



any age, regardless of whether you have pathology or not? How do you do that? By implementing a healthy lifestyle. And who wouldn't want it? You can be a better student, you can be a better executive at a company, you can be a better athlete, you can be a better mom, a parent, by making reason and judgment at the core of your brain health.

David Perlmutter, MD:

This empowering information applies directly to you. With this understanding, we see that we can make decisions that help create a brain that is resilient and strong. A brain that is resistant to disease. We have the amazing ability to reshape our brains by creating connections and even growing new brain cells.

David Perlmutter, MD:

In a very real sense, you help determine the destiny of your brain.

David Perlmutter, MD:

So we now understand that our brains are able to create new brain cells, new neurons, and re-wire throughout our lifetimes. And that our genes are not necessarily our destiny. What do we do with this information? Through lifestyle changes we are able to tap into these wonderful gifts, thereby helping our bodies and our brains to achieve their highest potential.

Dominic D'Agostino, PhD:

Epigenetics and neuroplasticity are intimately linked. We know that various molecules in the body, which are stimulated by things like dietary interventions, including a ketogenic diet. There's a wide variety of plant based nutraceuticals, I would call them, that can influence gene expression and that's a whole area of research. And then, we do know that prolonged exercise and also prolonged fasting, these things elevate molecules like beta hydroxybutyrate, which is a ketone body. And we know that the ketone body beta hydroxybutyrate is a profound epigenetic regulator by functioning as something called a histone deacetylase inhibitor. This is a class of drug that's used extensively in cancer therapeutics and now more recently in neurological diseases that can alter the methylation or demethylation state of our genes. And exercise and nutrition that increases beta hydroxybutyrate can then influence the positive expression of genes that increase molecules that can enhance the health and vitality of our brain.

David Perlmutter, MD:

In relationship to Alzheimer's, what can we describe that might enhance the ability of the brain to grow new neurons?

Jeffrey Bland, PhD:

Well, I think that the growth of new neurons in Alzheimer's and hippocampal regions, would be very, very similar to all of the things that we have learned that are stimulants that help to induce neurogenesis, the generation of new neurons. And I would say number one stimulation. We now know that music therapy even at late stage Alzheimer's can unleash certain latent things in terms of cognitive and emotional function in Alzheimer's patients. So if it can happen at the very late stage where there's been significant loss of a hippocampal function, then what about earlier, what are the stimulations that we can start to use to both protect against the loss of, and also stimulate the growth of.

Jeffrey Bland, PhD:

So you think of stimulating environments, you think of reading, you think of games, you think of simple things like everything from playing bingo to crossword puzzles. You think about nutrition and it's very, very important role for supporting regeneration. You think about lowering the load of inflammation, you think about increasing antioxidant protection against these oxygen radicals I talked about that injured tissues. You think about managing blood sugar, it's all the things that one uses through these multiple foci, that people like Dr. David Perlmutter and Dr. Dale Bredesen have been talking about, that it's not just one thing, silver bullet. It's multiple factors that aggregate together to support an environment for neurogenesis and the protection against a neurological injury

David Perlmutter, MD:

What are some of the ideas that people are talking about that actually do enhance our ability to make neuroplasticity work better?

Michael Merzenich, PhD:

Well, there are a lot of things that we know contribute to it and it you should be thinking about it really from an integrative perspective. Because we know that what you eat matters. We know that there are various ways that we can strengthen these processes from the chemical and dietary side of life. We know that it's influenced by what's happening in the physical side of your body in all kinds of ways. There's important contributions that come from physical processes that are impacting your neurology and then there are a whole variety of ways in which you can actually exercise the brain itself. You can actually improve the capacity to learn by exercising the brain or to change your brain for the better. And all of those things should be engaged by anybody that really has control of their adult life.

David Perlmutter, MD:

You've been involved recently in some very specific endeavors that actually do target types of exercise for the brain. Can you tell us about that?

Michael Merzenich, PhD:

We began to realize that we could change the brain, you could say actually it's important to understand, David, that it's really about changing the machinery of the brain. It's about changing its physical and chemical structure so that it's operating with greater efficiency or accuracy. For example, we realized that we could engage an individual in progressive training in ways that would improve the speed of operations of the machinery and improve its accuracy. And speed and accuracy are really important targets because we know that in the average individual you could say the maximum speed of operations of the brain occur roughly around their 30th birthday and then decline progressively from that point forward. And ultimately, speed is an index of how safe you are, how far you are away from collapse into Alzheimer's disease and into other forms of dementia.

David Perlmutter, MD:

You're talking about the importance of neuroplasticity, the ability of the brain to redirect its wiring and also speed. How do we create a fertile ground for those opportunities to happen?

Michael Merzenich, PhD:

Well, there are several dimensions to it, David. One is that there are a series of factors in the brain, but they're factors that contribute to or enable growth or positive change in the brain and you want those factors being produced in the brain. One of the ways that you can up-regulate them is by, for example, physical engagement in the world.

Michael Merzenich, PhD:

And then you can up-regulate them by engaging your brain by training it.

Michael Merzenich, PhD:

The other part of it is the plasticity in an adult brain, and one thing that really distinguishes it from an infant brain, is regulated by the brain by the release of what we call modulatory neurotransmitters. That's another way of saying that they're chemicals that tell the brain whether to save a change and make it permanent. So, basically, if something happens in our life and the brain is evaluating its value to us and if it thinks it's valuable, it says in a sense, "Save it." Let's change the brain permanently because this has improved our ability to do this, reach our goal, and that is achieved by the release of a

chemical and that chemical has effects. So the machinery that produces those chemicals that control plasticity is plastic.

Michael Merzenchi, PhD:

If you've stopped learning in life and no longer are learning any really new thing, and I mean by learning, I mean something that really challenges the brain to develop a new skill or a new ability, that machinery is dying. It's dying. You have to re-engage it. You have to re-engage it and challenge it by new learning, by progressive new learning. And when you do that, basically, it's empowered. As long as you live a life where you're physically active, where you're paying some attention to the chemistry of the body and what's happening in your gut and other things, those are really important. But also paying attention to what you're doing with your brain. Think about a life of continuous activity and continuous learning. In general, they will be healthy. Generally, you'll have a brain that's really ready for change through the course of your life.

David Perlmutter, MD:

How does that relate to Alzheimer's?

Michael Merzenich, PhD:

Well, you need to have a brain that's continually changing in a positive direction and one of the things that's a sort of a double whammy. One is that the brain is deteriorating across time in a sense. But the second problem that arises is that the brain has, the scientific word is down-regulated. The brain has reduced the power of these processes that could enable a correction. It's really important that you don't throw away the chance, you could say, of correcting the problem. Now, fortunately, at any age, under any conditions, until this machinery is actually really dying, until cell loss is substantial, and ultimately that does occur. But until that does occur, you have a powerful possibility of rejuvenation because this machinery, again, is plastic. You exercise it and you can recover it a lot, even when it's in a significantly deteriorated state.

David Perlmutter, MD:

So neurogenesis seems to be very important. What can we do to enhance that process?

Mark Hyman, MD:

I mean, the key is all the same stuff that we know, and it's obvious it's eating a whole foods diet, it's exercising, it's sleeping, it's getting tools that help you reduce stress in your life. It's optimizing your nutritional status, is getting rid of toxins, is optimizing your microbiome, it's balancing your hormones. All these things will help to optimize neurogenesis.

Max Lugavere:

And the way that we can do that, the way that we can stimulate that process of neurogenesis is with physical exercise and by eating a diet that minimizes inflammation, and that supplies the brain with the raw materials that it needs to create healthy new brain cells like phospholipid DHA, by minimizing stress. Stress is a major fighter for this process of neurogenesis. And so by catering to your stress needs ... and maybe that means meditating, maybe that means reading a little more often, or just ... maybe it's a process of omission. Maybe it's turning off the news more frequently. Those are all ways that we can help encourage this incredibly important process of neurogenesis.

David Perlmutter, MD:

We're really so grateful to our guest experts, for sharing their incredible depth of knowledge with us, in this intriguing and relatively new area of science. And I say relatively new, but let me assure you. It's getting a heck of a lot of attention. We've learned that it's absolutely essential to enhance neurogenesis. Support neuroplasticity, and take full advantage of the science of epigenetics.

David Perlmutter, MD:

Here are some practical changes you can start implementing today to accelerate this process. First and foremost,

- Eat a healthy diet that is nutritionally dense and that helps reduce inflammation. We're going to learn more about a brain smart diet in episode six.
- You might consider fasting on occasion.
- Exercise your body regularly.
- And exercise your brain by continuing to learn new things.
- Incorporate stimulating activities into your life. Things like reading, playing games, interacting with people. Playing bingo, or doing puzzles.
- Manage your blood sugar.
- Get a good night's sleep.
- Reduce your stress.
- Do your best to avoid exposure to toxins,
- and nurture your microbiome.

These are simple, but powerfully effective steps that will absolutely help you enhance things like neurogenesis, support neuroplasticity, and take advantage of epigenetics, right from the start.

David Perlmutter, MD:

Now if you feel overwhelmed, choose just one thing that you can start implementing today. Maybe it's just focusing on your

diet, or getting to bed earlier. Every bit counts when it comes to reducing your risk for Alzheimer's disease.

Michael Merzenich, PhD:

It's really about continuous growth. If I have the power to change my brain for the better, why wouldn't I do that? Because my brain is me. Why would I accept the notion that the latter half of life is a life of progressive decline? And then...if something happens to me that's a setback, why wouldn't I understand that that's a challenge to me to bring all of these forces together, to contribute to my rapid recovery so that I can be back operating as effectively because I've been given this great gift and this gift is a plastic brain. It can change at any point for the better. So it drives me a little bit crazy sometimes that the average citizen doesn't understand this, doesn't understand that they're the possessor of a fabulous gift, and that's a gift, the ability to improve their life at any point for the better by paying attention to these principles, understanding that their brain is plastic and to understand what that means.

David Perlmutter, MD:

Whether or not you optimize gene expression, enhance your brain's ability to grow new neurons, or support your brain's ability to basically rewire itself at any age, is really up to you. You have the power to drastically improve your health by taking advantage of these profound gifts that are available to all of us. Start implementing these changes in your life right away, and your brain and your body will thank you for it. Remember, implementing these changes can go a long way towards preventing Alzheimer's disease.

David Perlmutter, MD:

In our next episode, we're going to take a deep dive into the connection between diabetes, and Alzheimer's. We're going to learn why Alzheimer's has been called, "Type III diabetes."

David Perlmutter, MD:

And we're going to gain an understanding as to why preventing diabetes and maintaining a healthy blood sugar levels are two components in an Alzheimer's prevention plan. I can't wait to share this information with you.

David Perlmutter, MD:

I'll see you in our next episode: Diabetes and Alzheimer's, a Not So Sweet Connection.