An Evolutionary Perspective on Brain Diseases Transcript

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Introduction to the interview and red light therapy

We have to start with the foundational understanding that the way in which we see a problem, the way in which we conceptualize a problem, shapes how we pursue solutions to it.

And if you start from that simple idea, that sort of meta lens, that the paradigm that you have completely sort of constrains your thinking in a way where that paradigm essentially dictates how you will go about trying to solve that problem.

Hello and welcome back to the Evolution of Medicine podcast. I'm your host James Maskell and this week we are going to bring you an amazing interview that we recorded last year for the Reversing Alzheimer's Summit.

Ari Whitten is a good friend of mine and he is going to introduce us to the evolutionary way to look at Alzheimer's, where it's come from, and what we can do about it.

And it was really a transformational talk in my mind last year, and I think you'll get a lot out of it. The other reason why we're bringing it back is that Ari has brought out a second version of his game-changing book called Red Light Therapy.

Back in 2018, he did the first science-backed breakthrough book on red light therapy. It's become ridiculously popular since then. And for the second edition, he's actually got contributions from Michael Hamblin, who is a world-leading authority on the topic.

So ultimately, we thought this would be a good time to bring back Ari to the podcast, and I'm really excited to share this wonderful conversation with you.

Enjoy. Hello and welcome to a really special interview as part of our Reversing Alzheimer's Summit. My name is James Maskell. I'm one of the hosts here.

For those of you who know me, you know that I've had a business called the Evolution of Medicine and that's been looking at the way that medicine adapts and evolves to chronic disease.

And ultimately it's given us the opportunity to talk about evolutionary principles as well inside health, inside disease and inside the way that we eat and the way that we live.

Why disease paradigms shape treatment

And I'm super excited today because we are going to talk about an evolutionary perspective on Alzheimer's dementia and how that gives us an opportunity to really understand what's happening and what we can do about it in that journey.

And so I'm super grateful to have my friend Ari Whitten here. He is an author. He is a leader. He's a speaker. He's an educator. And, you know, we've been friends for a number of years and I think share a lot of ideas about what should happen to health and health care.

And so Ari, it's great to have you here. Thanks so much for having me, James. Pleasure to speak with you as always. Awesome. So let's just lay the foundation.

Tell me a little bit about how you see Alzheimer's and dementia through an evolutionary lens and why it matters. Well, you know, I think that we have to start with the foundational understanding that the way in which we see a problem, the way in which we conceptualize a problem, shapes how we pursue solutions to it.

And if you start from that simple idea, that sort of meta lens, that the paradigm that you have completely sort of constrains your thinking in a way where that paradigm essentially dictates how you will go about trying to solve that problem.

And in the context of modern medicine, the dominant cultural narrative of conventional medicine, and even to an extent, this has influenced a lot of alternative and functional medicine thinking, but the dominant conventional medical narrative is essentially the idea that we have these very distinct diseases that are killing us, and these diseases are caused by very specific mechanisms, typically biochemical or cellular mechanisms in our bodies, and that what we need to do in order to fix this situation is we need to Spend a lot of time uncovering these micro level mechanisms sort of the the more we get out the microscope and the more we understand these different disease states at the most micro level possible at the level of what's happening at the cells.

the blood, the inside of the cells and the different mechanisms and molecular switches that are happening inside of that cells. And once we figure out what's going on at that micro level with those specific mechanisms that are linked with this particular disease state, that we have uncovered the cause, quote unquote, of this problem.

And that once we uncover that cause, We can then go about finding a solution. And the dominant way of thinking in conventional medicine is once we uncover that, those mechanisms, we go into a chemistry laboratory and we synthesize man-made chemicals.

that are hyper-targeted to that specific mechanism that we found was dysfunctional in that disease state. And by using that drug to block that mechanism or to inhibit it or modulate it in some way, we can therefore cure the disease.

And this model has some basis in reality because it really is, it came out of the antibiotic revolution of the 90s and 60s. This whole model of thinking came out of this time period where we had these infectious diseases, certain types of bacteria in particular, and we had this breakthrough of first with penicillin, discovering, you know, at Petri dishes that this, that this, this mold was producing this compound that inhibited the bacterial growth in this Petri dish.

And that led to the synthesis of penicillin and many different generations of antibiotics. And some of these antibiotics were generally genuinely curative of diseases that were sometimes fatal, pneumonia and things like that.

You could now take this drug and that drug would act like essentially like a heat seeking missile that coursed through your veins and your arteries and your cells and in this hyper targeted way went and found the cause that singular cause of this disease state in this case of bacteria and killed it and literally cured the disease and basically that That era of medicine shaped our entire paradigm of medicine.

We then figured, well, if we can do this with these infectious diseases, why can't we do it with every other disease? So let's figure out these micro level mechanisms, the cause of this disease, of heart disease, of cancer, of dementia and Alzheimer's, of Parkinson's disease, of autoimmune diseases, of diabetes, et cetera, et cetera.

And once we identify those mechanisms, let's go to the chemistry laboratory, let's synthesize that drug that will cure the disease.

Evolutionary medicine and the failure of the drug model

And the problem is that while that model worked in some, to a large degree, especially back at that time, to genuinely provide manmade chemicals that were curative of these disease states.

in infectious diseases, it has been an abysmal failure when it comes to chronic diseases. So this model of thinking basically has constrained our whole view of how we approach disease states.

We've invested decades of research and trillions of dollars into this model of thinking and this path to solutions, drug-based solutions to target specific mechanisms that we believe are the cause of these diseases.

We've invested vast amounts of money and time and collective brain power of many, many brilliant scientists and doctors around the world, but it's in a model of thinking.

It's in a paradigm that has It's hard to imagine a paradigm that has a worse track record of success with chronic disease. And yet, because it's sort of our only paradigm, it's the dominant paradigm, nobody thinks to do anything differently.

It's sort of just more of the same. Well, if we haven't uncovered the right mechanism and developed the right drug that targets the right mechanism in just the right way.

But it's not that. It's actually a problem. It's a failure of paradigm. not a failure of finding the right drug. That's interesting. I'd love to just, you know, share this with you and you may have thought about this before, but from an economics perspective, what you've described is basically like diminishing marginal returns, right?

So the antibiotics was awesome at the beginning and now we're on definitely on the down slope of the return on, you know, this paradigm. And the problem is like in the way that it should work is as soon as you hit the flat part, you should go to the second best strategy and maybe the second best strategy is an evolutionary lens.

But because so much concrete is built around the whole system at the moment where you have IROI, i.e. medical education, the way the doctors done, the way the medical coding, all of that concrete exists, it's very hard to break through the paradigm.

And I think what we're doing on this summit and on what your work is about generally is showing the power of the second best. you know, paradigm, which is actually probably the best paradigm.

It's just that it's been subverted or that we were tricked by that initial benefit of antibiotics that this paradigm could do all these other things. So yeah, I'd love to just get your take on what I said and maybe take it into, you know, what your thoughts are on this evolutionary paradigm and the benefits that we could accrue if it became the paradigm.

Thank you so much to all of our mission partners. We are really grateful for their support in bringing you the Evolution of Medicine podcast. First of all, I want to say thanks to Fullscript coming up very soon, starting on the 23rd of February.

We have the full script challenge, which is going to be a five day challenge to make it easier for you to run a successful practice, take advantage of all the awesome tools they have.

You have to have a full script account to take the most advantage of it. And if you don't have one, go to goevomed.com slash full script. Sign up and we'll get you ready for the 23rd.

True Neura go evomed.com True Neura get a demo. We have got an unbelievable group of practitioners starting to build this network of clinics that are reversing cognitive decline and we really want you to be part of it.

So go and visit us there. Big Boost Marketing is the place to go for practitioners who are looking to grow their practice, get new patients in, build new models of marketing systems.

And so go and have a call with Uli over there. We've been working together for more than a decade. And then our last mission partner is Freedom Practice Coaching.

And Freedom Practice Coaching is really making it easy for practitioners to build strong, sustainable practices. We've got a great partnership going with True Neuro where we have about a dozen clinicians that are working together to build these brain health practices and doing it really successfully.

So go to goevomed.com slash FPC and check in with one of the team there and see if it might be a fit for you. All right, back to the podcast. Yeah. And part of what you're alluding to there is interweaved with what you were

mentioning there is obviously the financial incentives.

There are almost incomprehensibly large financial incentives to keep doing things in the paradigm that I described. Because if you are able to patent a particular chemical that is effective, quote unquote, in a particular disease, which might not even be anything close to a cure, but let's say it's something that slows the decline by X percentage, there's an enormous amount of money to be made in there.

So the financial incentives keep this paradigm entrenched. So again, the fundamental idea is what is, what Oriens are thinking is, what is the cause of this disease at the micro level?

And how do we develop a treatment, a drug or other types of treatments that alter that mechanism? But what if there was an entirely different mode of thinking?

What if instead of asking, how do we uncover these micro level mechanisms involved in these disease states and develop drugs for them? What if he said, you know, why don't we look around the planet and see if there are humans who have low rates of this disease that we're trying to solve, who don't have the burden of this disease like we do, and then why don't we study what they're doing differently?

Hunter-gatherer populations and low dementia rates

Right. And actually that line of thinking makes sense to us in almost every other context that we might look at in life, whether like you want to build a thriving garden.

Well, what do you do? You go find people who have thriving gardens and you study what they do. You want to build champion athletes. Okay. Go find some champion athletes, figure out what they do differently and how they train and replicate that.

Right. You want business success and you want to learn how to be wealthy and so on, then find people who are very good at that and start to replicate what they do.

This is the obvious thing that we do in every area of life, except when it comes to human health and disease, where what we do is we reverse it and we say, let's go study the people with disease, figure out what's going wrong in their body, and then go develop a treatment to try to reverse what's going wrong in their body.

It turns out that there are humans on this planet that have essentially already figured out how not to have dementia and Alzheimer's. And that simple fact ought to be considered like a totally revolutionary scientific discovery.

And we should orient our way of doing things around this discovery that there are humans who don't have this problem, who are, who are, have already demonstrated that it is optional to have Alzheimer's or dementia.

Instead, what we do is we completely ignore those humans and we go back to the chemistry lab and focus on drugs. so what am i referring to when you put it like that it does sound totally insane it is it is totally insane and actually that's the part of what i was getting at before is the paradigm has entrenched our thinking so much the dominant paradigm that we can't see how insane it is.

We are literally blind to our own insanity. And everybody, and there's so many, you know, highly intelligent doctors and scientists who have all these impressive credentials and letters after their last name, who are operating in this paradigm that we assume we think it, well, it must be a really smart way of doing things.

Look at all these obviously very smart people who are, you know, in the lab, trying to uncover the mechanisms of Alzheimer's and go into a chemistry lab and, and develop drugs for it.

It has to be the smart way of doing things because all these people are doing it. But I would argue it's, it's just not, it's, it's more a function of.

heritage than anything else, meaning this is the way things have always been done. We all grow up as children in this collective cultural narrative that diseases have these very specific causes and that pharmaceutical companies are going to come to the rescue by developing cures, quote unquote, to solve these diseases.

And we just can't see outside of our cultural narrative, no matter how many failures it has. So let me, let me say, let me clarify exactly what I'm referring to when I'm talking about these people who have demonstrated this.

When we look around the world at hunter gatherer tribes, at humans who still live in the traditional human way, the way that humans lived for most of our time on this planet, up until the last 10,000 years or so.

with the advent of the agricultural revolution. These humans have almost no detectable rates of Alzheimer's and dementia. It doesn't really exist in these populations, or it's so small as to be entirely negligible.

So I'll mention one specific population that's been studied. You know, part of the problem in the past with invoking hunter-gatherers is, number one, there's so few of them, of these tribes, Number two, in recent years, some of them have sort of been westernized.

They've incorporated smoking tobacco and eating sugary, you know, trading with neighboring groups for sugar and donuts and things like that. And so sort of the purity of it has been diminished as well as having not the most robust evidence.

But that started to change in recent years, in particular with a group in Bolivia called the Tzimane tribe. It's spelled T-S-I-M-A-N-E. And what they found is that.

These people have, number one, they have the healthiest hearts and lowest rates of cardiovascular disease of any human population that's ever been studied.

And it's also true that they have the lowest rates of dementia and Alzheimer's of any human population that has ever been studied in the history of this planet.

Now. Specifically, they have less than 1% dementia rates in their population, and that's in contrast to in the US, it's about 11% dementia rates. Now, some people, when they hear this, they start thinking, and this can potentially be digression if you're interested in going down this path.

But they say, well, don't those hunter gatherers only live till 35 or 40 years old? You know, they only die at 40. Of course they don't get dementia because they don't even live old enough to get dementia.

Actually, this is a complete misconception. It's actually a misinterpretation of data. that is heavily skewed by child and infant mortality rates. Basically, hunter-gatherers have high levels of death of infants and children, and that skews the overall average age of death heavily, heavily downward.

And the reality is that adults in these populations, who have no access to modern medicine, by the way, live to the same maximal ages as modern Western humans do in the US and in Europe.

In fact, some of these studies on the Tzimane have people in their 80s and 90s in the studies. Hunter gatherers, again, with zero access to drugs or modern medicine, living to their 80s and 90s.

So the way they do these studies is, of course, you control for the segment of the population that you're looking at. So you don't compare a 75-year-old in the US to a 35-year-old Tzimane person, you compare what are the rates of dementia or Alzheimer's in adults over the age of 65, for example.

And that's what I'm referring to in these studies where they found that there is over a 1000% difference in the prevalence of dementia in the US and in Europe compared to these populations.

Basically, what this shows us is that Humans don't have to get these diseases. It's optional to get these diseases.

And it shows us that these are, that this is a disease that is what's called a disease of evolutionary mismatch.

It is a disease caused by the mismatch between our biological design and the modern environment and lifestyle that we now live in. Yeah. Give us some examples then of, you know, things that in the hunter gatherers are living and features of their living that are being sucked out from modern living and that might be driving this increase in those areas.

Yeah. Well, there's no question that diet's playing a big role. And we know this, we have lots of lines of evidence, of course. It's no secret that the modern Western processed food diet, the standard American diet is a major driver of many, many different diseases, obesity, diabetes, heart disease, metabolic syndrome, many, many cancers.

And it's certainly a driving factor in dementia and Alzheimer's and many other diseases, fatty liver disease and chronic kidney disease and all kinds of things.

Another big factor is of course, community and modern social isolation versus tribe and community.

Physiological resilience and reserve capacity

The load of environmental toxicants is certainly playing a role. Being in nature, honoring circadian cycles and the cycles of light and darkness and sleeping are certainly playing a role.

But one of the biggest things that I really want to emphasize again, and this is kind of a paradigm issue is within the medical community, and I would also say within the functional medicine community, we have a paradigm that is very, very fixated on stressors, on what are the problems.

You know, what functional medicine does really well that conventional medicine does not is it extends what we're looking at as far as the level of causation.

out of the micro level mechanisms inside a person's body to then start to look at, okay, well, what does your nutrition look like? What does your stress level look like?

Do you, do you have meaning and purpose in your life? Do you, you know, are you socially isolated? What's your toxin load? You know, let's start to look at some of these, these factors going on.

You know, let's look at mold and your environment and so on. So they're, they're starting to expand that out. However, the paradigm is very much, in my opinion, entrenched in a model of looking at what is the bad stuff in the environment that is negatively affecting the body and causing these disease states.

And what's largely missing from this picture and what I want to emphasize here is the role of physiological resilience. And this is something that in the literature is called, it's sometimes called the homeodynamic space model of health.

And it's also called, there's many different subsets of it, but it's called the stress buffering capacity or the reserve capacity. of the system. And there are many different types of reserve capacity in our body, but it is essentially the level of performance that is built into the various systems of the body.

And this is the key distinction that I want people to get here is The way that most people look at health right now is sort of, we just assume the body is sort of in a state of health and homeostasis until various negative forces, various stressors, toxins, psychological stress, bad sleep, bad diet, et cetera, et cetera, start to act on that perfect state of homeostasis.

And the additional thing that we need to incorporate in this picture is We need to get rid of the assumption that the body is by default in an ideal state of health and homeostasis.

In fact, what's really going on is we can have radically different levels of functional performance. and resilience and

stress buffering capacity that is built into the different systems of our body and brain.

And that is just as big of a factor in our risk of disease, our rate of biological aging as the negative factors, as the stresses themselves. Yeah, I love that.

And I think it's a good, it's a good starting point to create real thinking about this new paradigm. And I'm glad you brought that forward. And I'm glad you talked about physiological resilience too.

So tell me how does this reserve capacity protect against dementia and Alzheimer's and what evidence is there that you think this is connected? Yeah. So there are a number of different key reserves, specific reserve capacities in the human body that are directly relevant to dementia and Alzheimer's specifically.

One is what's called cognitive reserve capacity or brain reserve capacity. Those are different reserve capacities in the literature. I personally would argue that they're heavily overlapping, even though historically they have been treated as somewhat separately.

And we can come back to that in a moment. Cardiovascular reserve capacity, muscular reserve capacity and mitochondrial reserve capacity or bio-energetic reserve capacity are probably the biggest ones that relate to dementia and Alzheimer's specifically.

Now. As one point of context, I'll give you a few interesting data points here and then we can explore how this works. Why is it that going into a hot chamber of air several times a week has been shown to dramatically reduce one's risk of dementia and Alzheimer's by upwards of 50 and sometimes upwards of 65% in some research?

Yes. Why is it that we know that exercise, people who are very fit have a dramatically reduced risk of Alzheimer's and dementia more broadly. So specifically there was a study done out of Sweden where they tracked over 1400 women for over 44 years.

So they looked at them in midlife. And they did an exercise test to assess their current level of cardiovascular fitness. And then they followed them for 44 years and looked at, you know, basically until they died.

And then they looked at the incidence of dementia. And this study took place, I think, from the. I think it ended in 2012, something like that. Let me see if I can get the name of the study real quick.

It was, it ended in, from, started in 1968 and ended in 2012. And studies called midlife cardiovascular fitness and dementia, a 44 year longitudinal population study in women.

And what they found is that compared to moderate levels of fitness in midlife, The people with high levels of fitness had an 88% reduction in their risk of dementia later in life.

88%. And even that doesn't do quite justice to their findings because basically what they found is that the people at the highest levels of fitness, basically none of them got dementia ever.

So, and that's just looking at this one variable of how cardiovascular fit are you. It doesn't even take into account their nutrition, their environmental toxicants, their sleep, their stress, anything else.

It's just looking at their cardiovascular fitness. And that one factor alone almost accounted for a complete elimination of the incidence of dementia.

And again, that was even compared to the moderate levels of fitness. The numbers were even more stark if you compared to low levels of fitness. Now I'll give you one more interesting data point here.

And this relates to the cognitive reserve capacity that I mentioned before.

Exercise, heat, and cognitive reserve against Alzheimer's

It's been shown in a number of studies that higher levels of education early in life. just like going to school for more years, is very, very strongly protective against dementia and Alzheimer's many decades later, 50, 60, 70 years later.

Why is it that studying more, you know, as a child or as a teenager or in your 20s, that going to school more would translate into a reduction, sometimes 50, 60% or more reduction in the incidence of dementia?

as an elderly person. This is kind of a bizarre thing, right? In fact, I'll mention one study here specifically where they even looked at ApoE4. And so ApoE4 is a genetic variant that is strongly linked to an increased incidence of Alzheimer's disease, of dementia and Alzheimer's disease.

And this, there's been a lot of hubbub over this over many years of, you know, increases your risk of Alzheimer's by 200, 300%. You know, there's, there's, there's a very, very big deal made over this.

Well, there was one study where they looked at people who either had the APOE gene variants that predispose them to a very high risk of Alzheimer's or didn't have those variants and therefore had a low genetic risk, a low risk based on genetics for getting Alzheimer's.

But they did a further subset of people who either had lots of years of education, as I should say the three categories, basically less than five years of education, and then six to eight, and then more than nine years of education in their youth.

And basically what they found is that. the people who had the worst genetic variants in terms of APOE4 predisposing to a high risk of Alzheimer's, but who had more education, years of education, nine years or more, had a lower risk, specifically a 62% lower risk of Alzheimer's than the people who had the lowest risk based on the APOE for gene variants, but who had less than five years of education.

So basically, what I'm getting at here is If you look at the theme of what I'm presenting, it is that challenges to the system, challenges to the body, whether it's thermoregulatory challenges, whether it's muscular and cardiovascular and bio-energetic mitochondrial challenges, or whether it's cognitive challenges.

do something to the body that seems to translate into dramatically reduced risk of dementia and Alzheimer's. And if you tie that into everything I was telling you about hunter gatherers, you will realize that all of those things are embedded into their lifestyle.

Absolutely. Yeah. So let's just tie that up because I feel like that is a theme that I think everyone can walk away from from this talk, which is that you have to challenge yourself.

And I assume the earlier you start challenging yourself, the better. And the more you are in a challenging, you're challenging yourself throughout the life is creating that score.

And that score will help you as you get into the later years. Yes. Yeah. So the basic principle of how this works is you have to understand that our physiology is malleable.

Okay. So we are an adaptive system. And the easiest way to understand this is everybody understands how our muscles do this. We go into a gym, we lift heavy objects.

We understand that our muscles will adapt to that by growing bigger and stronger. Similarly, we understand that if we were to break an arm or a leg and get a cast on it, eight weeks later, when we go to the doctor to saw our cast off, we will look down at our limb and it will be half the size as it was before.

And the reason why is muscle atrophy. And that is the same principle in reverse. The body is adapting to disuse. So if you don't use it, if you don't challenge it and stimulate it, the body gets rid of it.

And the body only cares about survival. So it is merciless in getting rid of things that are not needed. And what

people have to understand is that that principle isn't only active with our physical muscles.

It's active at almost every layer of our physiology, from our neural circuitry in our brain to our cardiovascular system. to our mitochondria inside of our cells.

It's been shown, for example, that the average 70 year old has lost 75% of their mitochondrial capacity. Conversely, it's been shown that the 70 year olds who are lifelong exercisers have the same mitochondrial capacity as young adults do.

And so, which tells us that that loss of mitochondrial capacity is not just a normal natural byproduct of aging itself, but is a function of the modern lifestyle.

We know that the same process occurs in the neural circuitry in the brain as well, that we literally have atrophy of that neural circuitry in key areas involved in cognitive function with aging.

And that this parallels, especially the decline in cognitive demands that typically occurs during aging. Most people have most of their cognitively demanding years up until about the age of 20, 22. And then once they get out of college, unless they have a particularly cognitively demanding job, Most people's levels of cognitive demands in their life drop dramatically.

And that starts the process of cognitive decline of atrophy of this neural circuitry in the brain. So this is, this is a problem in terms of the physical structure that's there, but we have to understand that structure dictates function.

And function also structure and function also dictate resilience. the ability to resist stress and resist damage and dysfunction over time. So when you understand how those things are linked, we can understand why somebody who engages in challenges like going into a hot chamber of air, which doesn't in any way relate to some specific micro level mechanisms of Alzheimer's, of amyloid plaques in the brain, why somebody who rides a bicycle for half an hour or an hour each day or goes for a jog or goes for a swim or lifts heavy objects.

Things that are seemingly much less sophisticated and cutting edge scientifically than somebody who's a scientist working in a lab where they're uncovering the micro level mechanisms of a disease and working to synthesize chemicals to block that mechanism.

These things seem much more primitive than that, but in reality, they are vastly more effective than any drug that has been created for dementia or for Alzheimer's, despite trillions of dollars being invested into that path.

We have to change the way we think about things to understand why this is working. But the basic principle again, is that as we build more robust structure and function, we build resilience and stress buffering capacity.

We build these systems, our cardiovascular system, our mitochondrial system, our neural circuitry. We build them structurally and functionally in a way where they actually become more able to resist.

Closing thoughts and where to follow Ari Whitten

the negative forces in our life, whether it's bad diet, whether it's a psychological stress or poor sleep or environmental toxicants, they become much more stress resistant and therefore much less damaged by the ubiquitous stressors in the modern lifestyle.

Well, Ari, look, I really want to thank you for this presentation. I feel like, you know, this should be actually required listening at the beginning of the reversing Alzheimer's summit, because I think you're laying out a sort of a framework where the rest of the whole summit can come together and be connected because ultimately you'll hear lots of other things throughout the summit of different elements of what you're speaking at.

But I think what you've created is a cohesive framework to understand very actionable pathways for anyone who's listening, whether you are. in early stages, whether you're taking care of someone and so much great, great stuff.

For people who are inspired by this session Ari, what's the best way to like keep up with your work and be in the mix as to, you know, what you're up to and how can, you know, keep learning from you.

Yeah, my website is theenergyblueprint.com. And I have a book that'll come out later in the year on this exact topic that we were discussing here. One of the chapters is related to cognitive reserve capacity and focuses on brain health in particular.

But the subject of the book more broadly is on this principle of physiological resilience and how it plays out in the bigger picture, not just in dementia and Alzheimer's specifically, but the bigger picture of human health and longevity.

Well, we will make sure that everyone who comes to this summit, you know, make sure that that book comes out. We look forward to, you know, following and supporting your work.

Thank you so much for all of your support and making sure that this summit is a great success. And I really appreciate the opportunity to jam with you and learn from you and look forward to many more opportunities for that.

Likewise. Thanks so much for having me. All right. We've been with Ari Whitten. He's been talking about reversing alzheimer's and understanding it through the context of the evolutionary lens thanks so much for tuning in and enjoy some of the other sessions so that was the podcast what an epic session and just a reminder that coming up in april we will have version two of our reversing alzheimer's summit and we're going to have updates on some of the new studies from dr breaderson and be charting a path forward for the reversal of Alzheimer's and cognitive decline.

Thank you so much for tuning in to the Evolution of Medicine podcast. We'll be back again next week and thanks so much for tuning in and we'll see you next time.