The Coming Wave of Longevity Medicine Transcript

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Introduction and Background

All right, everyone, welcome back. We're joined today by somebody who I was excited to speak to because I actually ran into him a few years back when I was very early stage and learning, you know, about this world of anti-aging medicine, genetics, my gut microbiome and all these things.

I had never heard of before. And from all the people I had seen at this massive conference where there were 6000 people in Las Vegas, Doctor Joseph Raphael stood out to me.

I was like, one day I got to talk to this guy and work with him somehow because he knows what he's doing. You know, fast forward a few years later. We just spoke a couple weeks ago on the on the topic of telomeres, and it reminded me of, you know, the brilliance I heard when I sort of walked by him at that conference a couple of years ago.

But first of all, welcome. Thank you for joining us. Thank you for having me. Thank you. So I everybody I mean, there's a lot of people here that have seen and heard you speak before.

And, you know, what comes with that whole space of, you know, age related medicine where we're saying that medicine is not necessarily how do you treat illness, but it can be how do you prevent or how do you extend life?

How do you sort of put that in sort of a nutshell of what is even possible in terms of stepping out of the sort of primary care clinical world and saying there's a whole other way to look at medicine.

Sure. But I did exactly that, about 25 years ago, when, I was practicing primary care internal medicine and, treating patients, for their complaints and their illnesses and their acute diseases with some lip service to prevention, you know, colonoscopy, mammograms, right.

Counseling about diet, lifestyle, etc., but not with really any idea that there was actually a different whole paradigm to approach health care, which is actually health care, not disease treatment.

Right. Typically you go to your doctor to get treated for something. You would have conditions managed and what years of very, you know, voluminous research on the aging process has shown us is that the bedrock of most of those diseases is started to be created a decade or two or even three before the actual symptom shows up.

That is called a disease. And so, I started to explore that literature and found that you're much better off looking at, you know, with the exception of perhaps infectious disease.

And we'll talk all about the immune system and how that does fit into this model as well. But with the exception of getting, you know, sort of, you know, an accident or hit by a bug, in Western developed countries, there are degenerative diseases of aging and then neoplastic diseases, and those all start many, many years before with dysregulation of organ systems, physiological systems.

And there's ways to measure those. There's ways to to monitor the effective effectiveness of treatments. And there are treatments both, you know, from lifestyle, diet, exercise supplements, medications and hormone optimization, all those things to not only prevent the diseases but also to maintain optimal functioning of that organ system.

So care of one's health, maintaining optimal health as you age is the paradigm shift that I think, you know, started back then, but is is really getting a full head of steam now.

From Disease Treatment to Health Optimization

Yeah, I think a lot of the technology that was needed, you know, pioneers like yourselves pushed it ahead. So there was there was thinking and there was theoretical work.

But now the ability to measure whether it's even cost effective and available to more people makes it sort of prolific. Right? And when we look at things, we kind of think the same way, but we only have one tool.

We look at your genes and we we try to be predictive in terms of, again, which organs may suffer, where the inflammation may hit, why inflammation may hit.

Meanwhile you have tools where you can measure in time, like you, there's things that you've curated or even built. So walk us through some of those things that you may do if somebody walks into your clinic tomorrow.

Yeah. So what we typically do, I mean, people don't come to me with a sort of single complaint typically, although, still probably see some women and men for initially their women, their complaints of menopausal symptoms and intervals of symptoms.

But a lot of patients now are coming, particularly because of the kind of practice that I have where it's a much more comprehensive view. And we do a whole battery of tests to assess two things.

One is where you stand in relation to people. Your age, in terms of the functioning of major organ systems. And those are called the sort of biomarkers of aging.

And then even systems, and measurements that, you know, we are routinely done, but other ones as well, that aren't necessarily as highly correlated with aging as a biomarker of aging is, but we know what's a good level.

On a bad level, we do you know, a few hundred different types of tests on on patients to give an idea about what their overall physiological age is, the agent, other major organ systems, and then also give a report card.

It's actually graded across the spectrum of the results that you can get from any individual test. For instance, hemoglobin A1, C, LDL cholesterol. You can get more esoteric, and various other ones.

But to then give them an idea about what their sort of optimal health and functioning is. And at that point, if it's not as often as it could be, then we start to target therapies toward them.

You know, in a stepped approach, from the least risky, which is, you know, if you're getting three hours of sleep a night, that's the first place to start.

You know, if you're smoking and drinking excessively and eating a poor diet, then, you know, those are those things. But then as those, if the markers don't respond fully, then we start to add supplements, medications, and then potentially other types of therapies that sometimes I send off to my other colleagues to do some cell therapy, etc..

So the idea is really to get a very, very robust picture of where somebody is so that we know that they may be at risk for something many years down the line, but even before then that they're there are functioning in that organ systems not as optimal as it could be.

So when you're looking at these, the results, are you so a big part of who does a better job is the interpretation. Right. So are you. And in every business there's kind of industry standards.

Right. So what you're looking at are you looking at things differently. Meaning this marker that may mean 7 or 10 means nine out of ten to you. Yeah. I mean, so for instance, take a typical test.

I mean, I'll just start with sort of a routine test that virtually every doctor in primary care offers a chemistry. Or, and within that there's, creatinine.

And then there's liver function tests. I mean, you'll see, a normal range, right. For alt, it might be 10 to 45 or something like that. And if it typically the way medicines practice, if they don't see it flagged off as high or low, then they kind of ignore it, saying it's okay.

And I call that normal range medicine, which is okay if you're looking for diseases because a disease is defined when you're outside of those ranges. But some biological variables are continuous.

You know, let me say that again, biological variables are continuous. They are not dichotomous where you either have it or you don't have it right even to with infectious disease.

And you can get a little inoculum but not a full inoculum. And sometimes people will get hit with Covid and they won't have any symptoms. Sometimes they get enough of inoculum, then they'll have serious symptoms.

But it's it's continuous. And so to say that you either are normal or abnormal at a particular cutoff because you're within 95% confidence intervals of all the people have gone to that lab, doesn't make much sense if you think about biological variables as continuous.

So I think a I think of them as being able to be interpreted within the full range. And there's there are lots of studies showing that, for instance, in Alt that's just below that upper end of, say, 45, is associated with considerably increased cardiovascular risk, whereas one that's just above the bottom and there's sort of an optimal.

So we'll give a grade for, you know, diseased fatty liver or, you know, hepatitis. Then after that borderline average, healthy and then optimal, then, you know, for your gut, for instance, you want to be in single digits on that.

I mean, that's that's where you want to be because that's deliver. That's not inflamed. It's not leaking enzymes. It's, there's no fatty liver, there's not a lot of toxins going on.

So to tell a patients that they're moving from within, within the normal range from average to healthy and then to optimum is is important work that will pay dividends down down the line.

Likewise for hormone optimizations. You know, the craziness where if your testosterone is 302, you're you have normal testosterone. But if it's 298 you have hypogonadism.

I mean, that doesn't make any sense, right? Somebody that is at 302 is a hell of a lot like more like somebody symptom wise, who's at 298 than someone who's at six, 708 hundred.

So, the software that I developed for health analytics helps doctors to look at all of these numbers with a spectrum to get a grade on them. And then in addition, the more esoteric markers that we do for, that are biomarkers of aging are, are also integrated into software.

So you can look at the aging process, but then also at the individual risk factors like hemoglobin A1. See some people would say well it's below 5.7. Who cares? I mean then you're good.

But no, I mean you're better off if you're at 5.2. Which is, you know, the very bottom of the I mean, if you're below five or even better, I don't know what it is.

And if you can get off the top of my head, it was in the in the metric unit, but, that's sort of the range of the normal. So that's the tool to practice health care, rather and not normal range medicine, so that then you can keep somebody functioning at as high a level as possible for as long as possible.

So the interpretation revolves around as opposed to waiting for the, the warning flag or the red flag.

Interpreting Biomarkers for Optimal Health

It's about maintaining somebody at sort of that homeostasis like this is where you're supposed to be, right? So it's

more a maintenance program than a reacting to the emergency program.

Yeah. I mean, it's it's a it's approach that is that recognizes that peak physiologic function for most organ systems is somewhere between 25 and 30 years of age.

And after that, most systems not all, but most systems lose between a half to 1% of function per year. You know, in almost a linear fashion, from sort of 25, 30 to 65, 70.

And then it can accelerate depending. And then once you get up higher ages, they have different kinds of genes, you know, centenarians. And then it kind of levels out, levels off there.

But, recognizing that and saying, you know, okay, let's try to maintain this close to that optimal function as possible, given, you know, an understanding of the risk and benefits of any particular therapy that, that you're going to apply to maintain that.

Right? Okay. So you looked at, blood markers and you try and interpret it for optimal health versus, you know, disease or symptom masking. Then when it comes to the solutions, how do you navigate a system where the tools are designed to do exactly that mask and suppress symptoms versus optimize somebody?

Where do you because there's no pill you could prescribe for someone who's considered healthy, but you want to get them a little healthier, right. And you want that agent to slow down.

What are you can I mean, okay. That's a that's I mean, that's part of the change in the thinking about it. So, for instance, we measure something called Central arterial pressure, which is a way of looking at, essentially what you would get if you had a catheter in a year or two.

But the instrument can look at the waveform in the brachial artery or in the radial artery. It looks like a blood pressure cuff, but it does a much more sophisticated device in that and gives you something called pulse wave analysis.

And that will tell you how stiff your arteries are. And that happens way before you start to get actual hypertension. The increase in stiffness that occurs, you know, you'll see a slight increase in systolic pressure that doesn't quite reach the cut off of, you know, it's been coming down for good reason from 140 to 135.

And now talking about 120 being more optimal. But if somebody comes in with and they're, say, 45 years old and they have an arterial stiffness that's, more like an 85 year old and they're still not hypertensive, and you've tried weight loss, you know, sort of exercise, supplements, you know, Mark, you talked about a lot of different supplements you can take with your 40s.

There's elderberry, there's hawthorn, etc.. Meditation, if those aren't bringing it down, then you can use an angiotensin receptor blocker or an Ace inhibitor or a calcium channel block.

And you don't want to use a beta blocker because it doesn't lower central to your impression. It doesn't have the lowest cuff pressure, but it doesn't lower central arterial pressure.

And and I have patients who don't yet have hypertension or I'm therapies like that. Typically they're patients that have a strong family history of central hypertension.

And so and I, you know, I'm doing them a favor because those medications are sort of like vitamins for the arteries. I mean, they're they reduce inflammation associated with decreased risk of diabetes.

You know, some of them, some of the receptor blockers can lower cholesterol a little bit. So, yeah, I mean, there's that's the the hallowed, practice of off label medicine, practicing, which allows you to do that, you know, in the context of the individual patient and their needs and your medical judgment.

This is also backed by, you know, studies that show that there are these benefits at these at these levels of, of lower of lower pressure. So, yeah, I mean, absolutely, you we have those tools, some medications like some pain medications, you know, they're there to, to mask the pain.

But the therapies that we apply are to reduce inflammation, to improve the ability of of cells to regenerate telomerase activation. There's, you know, antioxidant therapy, all those things aren't masking symptoms.

They're they're affecting the aging of the organ system. The the work that needs to be taught. And when you're, when you're doing that type of work, I mean, so the way you've, you've just spoken of what you believe, you know, in the medicine of aging to be there's a lot of companies out there that are now coming out with sort of biological age products, but they're very siloed, looking at very specific things.

For example, there's a product that looks at methylation markers, right? There's another product, from Vineland that looks at your gut microbiome and mitochondrial function.

So are these sort of independent tools enough or are they like a snapshot? And, how do you how do you convince people or how do you I'll do what you're doing, which is, I guess, more comprehensive with your organ system to make that sort of available to people.

Yeah. So I think a big question early on in the field, let's say the mid to late 90s and early 2000 was, you know, what's the best biomarker of aging, you know, which is the one that met the criteria that the National Institutes of Aging sort of established, which was, you know, if taken in middle age, could predict morbidity and mortality, you know, toward older age, and was sort of noninvasive and had high accuracy, and could be used in animal models and also in humans.

The NIH failed to find a biomarker that met those criteria because it was really kind of a crystal ball. I mean, human biology, mammalian biology, even lower, sort of less complex organisms is super complex.

And so then after that, you know, so there was telomeres were pretty hot biomarker for for a while there. DNA methylation that you mentioned. Another one, the one I mentioned is a pretty close correlate of chronological age, arterial stiffness when it was often used in the clinic.

Pulmonary function testing, spirometry fev1 highly correlated with chronological age and huge studies of hundreds of thousands of subjects. Most parameters give you a lung age.

And we do as well in our practice. But you know, none of those individually gives you a robust picture of the full aging process. We put together panels of them where we look at arterial stiffness, pulmonary, cognitive function through a, a battery of tests at CNS level.

Science does skin elasticity, body composition, etc., and put those together in multiple linear regression models. We looked at other kinds of more sophisticated models, and you can spit out a, a number, and we do what's called the visual age.

But what we're learning, I think is becoming quite well accepted at this point is that there's no single biomarker of aging that captures all the important aspects of aging.

And also within each each individual and certainly within populations, people age at different rates. That can be vastly different even within themselves.

Like I have patients that come in, we'll have a Cuomo age, as we call the the the fev1 of a 70 year old when they're 50, and yet they have a cardio age of a 45 year old.

And people will say, well, these aren't very accurate markers that you have. I mean, what the hell? You're not predicting the chronological age. Very well.

Well, I'll tell you the truth is that people have strong systems, they have weak systems. And it could be from genetics, but you're doing it could be from, lifestyle.

It could be from, environmental toxins, from infectious agents. As we age, you know, even twins will diverge. Monozygotic twins will will, identical twins will, will diverge as they get older, depending on the slings and arrows that their, their bodies have been, subject to.

And, and so, the more not the more markers you have, the better you're able to target your therapy toward the system that that is weaker and the shorter systems that are stronger, even, you know, appropriate biomarkers like DNA methylation, which is gene expression patterns.

You know, depends on what they're trained on. If they're trained on chronological age, they're somewhat useful, but they're not that useful.

Personalized Medicine and Multi-System Aging

The newer ones, the second generation ones are trained on, other biomarkers of aging, you know, routine blood tests that have, correlated with mortality and chronological age.

So. Well, I think what we're learning is that, particularly with the computing power that we have now, the more markers you have of all different systems, from the macro level to the organ system level to the physiological level down to the molecular level, you get a more robust picture and a better way of assessing the effectiveness of your therapies, and also a potential off target effects that may or may not be beneficial.

So what you said there was fascinating because people that, you know, work on anti-aging medicine, I mean, talking about the actual patient, the consumer, they're looking for precision.

They're looking for some personalized and and that's why they go when they spend the money and it's out of pocket, they're doing this work. And what you're saying is that essentially they're the tools that have been curated, have been driven back to this one size fits all.

Whereas personalization is you need to look at each organ and system and deal with one independent of each other. That's that's precision, right? And precision isn't.

This marker said. My biological age is 58, so let me do some detox. Right? Right. Because you don't know what to work on. Yeah. I mean, so I think that, the way I would put that is it's pretty similar.

But what I would say that, you know, look, each company that offers a marker or an instrument or some panel of markers, has, you know, its strengths and the things that it can do.

Well, and then it has its weaknesses and precision medicine is to get as, as you're saying, as robust a picture as you can and as granular a picture, as you can.

Of the individuals aging process, because there is that variability between individuals and within individuals that we're becoming more and more conscious of.

And I you know, can tell you, having measured thousands of patients, what you what you don't see is that someone has the same, you know, age of their arterial arteries, the same age of their lungs, the same age of their, the skin, their cognitive function as their chronological age.

There's nobody that comes in at average for all those organ systems. Some are very high, some are very low. And it's dependent on genetics and all the other things I talked about.

And you need to know that because the, the thing I, you know, the thing I don't like about what happens is, you know, in social media is when you have people that take scientific literature, that's legitimate, you know, the

conclusions of the study are legitimate, but then saying it applies to everybody when it really only applies to the person who's who's exactly like the average person in that study.

And that's not that many people out there. So, they'll say, well, you know, everybody should do this ketogenic diet or everybody should take this supplement.

Everybody, you know, I think the classic example is metformin. I mean, you know, everybody's saying you're metformin. It's like the longevity drug. There's great data showing it.

You know, people in their 70s and older who are taking metformin die at a lower rate. Even if they have type two diabetes, they're a little bit overweight and have fewer, you know, have less cancer and cardiovascular disease.

And people who are the same but are now on that form. Well, that may be true. And I think there's good data for that in the team trials. You know, that's the upcoming trial is going to look at metformin in aging.

People may show that that those benefits are there in a controlled trial. But most of those people are not exercising every day. They're not lean. They're not, you know, eating a good diet.

The hemoglobin A1, C is not in the optimal range or insulin sensitivity is not in the upper freezer. Sort of sedentary, a little overweight, and have inflammation going on.

Metformin is great for them, but not for people. I mean, I don't take metformin because I don't fit in any of those categories. And I'm not saying that metformin might not be beneficial for me, but the study hasn't been done to show that.

And that's that's the thing. That's when you get back to talking about precision and personalization of it. That's what that's what I do for my patients.

They come to me and they say, well, I've been reading about this and hearing about that. My friends doing this, should I be doing it? And I can give me an answer based on the very complex and robust, evaluation of them that I do. Right.

And often the most challenging person to our patient to deal with is the person who's doing well, because the delta value between where they're at and where you can get them to is, you know, it's a kind of a challenge, right?

Dealing with a pro athlete who's got the best of everything. And get me further, how much further are going to take you versus like you said in those studies, in fact, I think a Harvard posted something about, you know, five simple things you can do to add 14 years to your life.

And it was basically like exercise, eat properly, don't drink, don't smoke. So the average person you're speaking to a paradigm where it just let's just get the habit right, let's get you, you know, to a better level of health.

And, you know, so you're not susceptible to all that stuff. Anyways. So way back to this. You mentioned telomeres a couple times. I know you recently hosted, a summit where literally thousands of people, you know, enrolled to learn about what you had to say there, and there's a lot of buzz around understanding your telomeres.

So for the layman that has never heard that word before, what does that mean? How does it work? Why is it important? So telomeres are the caps on the end of your chromosomes.

That serve as molecular clock basically your DNA repair mechanisms in your that you repair when you get a mutation or, oxidative stress causes the problem with your DNA.

It gets damaged. Doesn't like to see single ends or what we call linear chromosomes. So you have to coil it up into a little cap. That's the end of your chromosomes.

And but every time your cells divide those ends, your chromosomes get a little shorter. Now, the way in which telomeres are designed, the DNA that's in them is non-coding.

So it's tag repeats of 12 to 15,000 base pairs, or what we call, you know, nucleotides of two nucleotides as a base pair. If you lose them, you don't lose any information for making proteins or other things that are important for human physiology.

But when they get a little bit, they divide and divide divide to get too short. Then the cell can no longer divide. And that's a problem for tissues like, your immune system, which has to divide a lot to respond to tumors to keep them at bay.

And infectious diseases, particularly viruses. Or, you know, the stem cells that sit in your muscles that have to respond to breaking down muscle fibers, muscle cells with exercise and replenish them, or your liver's, your liver, stem cells, if their telomeres get short, then they can no longer do their job, and they can't, replace those tissues.

And that's kind of a, sort of, hard end to how long you can stay on this planet with all your delimiters and your stem cells get too short to divide. You know, you don't live beyond that.

The other thing that happens when you're telomeres get short, particularly in your immune system, is that those cells don't just stop dividing. They, they don't like what they're supposed to do.

The cell stops, doesn't work anymore. It sort of just undergoes what's called Apatosaurus, where it just destroys itself in a very orderly fashion, doesn't cause inflammation.

These cells stick around and they secrete a lot of inflammatory molecules. So they cause a lot of inflammation.

Telomeres and Cellular Aging

So not only do they not do their job, but they also wreak havoc and can cause other cells to become damaged. They're sort of like an old a blind, old watchdog that no longer can, you know, fight off.

The burglar is trying to come in, but it's also biting the older and the neighbors. So, yeah, it doesn't know what to attack, what not to attack. You know, autoimmunity goes up.

Tumor surveillance goes down. The ability to fight off infections goes down. We all know that age is the number one risk factor for succumbing to severe disease with, in Covid.

So, immune systems are very important part of it. So the telomeres are major actors, players in how healthy your immune system is. And if they don't have reserve in terms of length to allow them to divide, then a lot of things that are characteristic of old age, can be explained through that.

The other thing that telomeres can do, which is interesting to you, perhaps into your audience, is that they're not only the molecular clocks, but it's now becoming more appreciated.

Not fully, fully, certainly not fully worked out, but more appreciated that they are also regulators of gene expression and also regulators of mitochondrial health, mitochondrial biogenesis.

And so if they get too short, then the pattern of gene expression can change. If they get too short, then mitochondria will not be replaced and kept in healthy level.

So keeping your telomeres at an optimal length is a really very important part of the aging process. There's, what are called the nine hallmarks of aging.

It's not the complete theory of aging, but, it's various aspects of aging at the cellular level that have been thought to be very important for aging and telomere shortening is the number two one, the first one being genetic instability,

from, you know, damage and other things like that. So minding your telomeres is, is is important part of lining your aging process?

Yeah. Big red flag potentially, or a sign of good health and being doing things right. You mentioned a couple times cognitive aging and a lot of the people that we speak to, they think of aging as a neck down thing, you know, like your skin, your hair, white hair, heart, like things that you're used to, the brain.

It's kind of like you just assume it keeps ticking unless there's dementia or Alzheimer's or so. But again, some calamity crisis. Otherwise people don't think about aging in the brain.

So what's going on there where you talk about cognitive aging? Yeah. So, you know, cognitive aging, you know, people, of course, know about Alzheimer's disease because there's, you know, a tsunami of Alzheimer's coming down the pike.

If we don't figure out some way to slow that down, which I think there is some there's some reason to be optimistic about that. But, but it's not just sort of regular cognitive function.

And then all of a sudden, you know, for five years and then you have dementia. There is well documented decline in certain aspects of cognitive functioning, you know, even from the mid 20s, it's not so much in memory, which sort of people kind of associate as quintessentially cognitive function.

It's more like in processing speed. It's the reason that, you know, the teenager is a little better at playing video games than the 20 year old and the 20 year olds better than the 30 year old, another year olds better than 40 year old.

This central processing ability, called, the physical processing speed, declines about 1% per decade starting in the mid 20s. And there are tests that can measure that, just sort of like a video game.

But they're difficult tests that require rapid processing speed. And you can see whether that's happening at a normal trajectory for your age or at a faster trajectory.

And you can pick up things. If it's at a faster trajectory, then that's called mild cognitive impairment. And mild cognitive impairment is not the same as age associated memory impairment, which is the natural decline that does seem to take place.

It's a more accelerated one. Just as for instance, I mentioned arterial stiffness. That's a universal phenomenon that your arteries get a little bit stiffer.

And but if they go with the natural rate, you'll never actually get hypertension, you'll die or something else. But if that stiffening occurs at a more rapid rate, then you're going to get hypertension and then go on to the, you know, the problems that hypertension can cause, heart failure or stroke, etc..

Likewise with cognitive function, if you're losing cognitive function at a faster rate, that's, mild cognitive impairment. And that increases your risk of getting into dementia before something else kills you.

So again, these are all phenomena that can be picked up many, many years beforehand. And they also are things that are susceptible to certain things. Like people talk about using Benadryl as a as a or diphenhydramine, which is an anti histamine.

It's over-the-counter as a sleeping well that's that's great. It works. It works because it's a side effect. It is that is anticholinergic meaning it affects your cholinergic nervous system.

Kind of knocks it out a little bit, puts you asleep, makes you groggy. But that's the same part of your nervous system that's important and that you lose in Alzheimer's disease.

So taking something that's knocking out your nervous system every night is not a good idea. So better ways to fix your sleep than that. You know, so somebody is having a little bit slowing in their cognitive functioning.

You want to look at what drugs are they taking that have off label, off target effects or what the side effects that are not intended? You know, looking at the effect of exercise, exercise is a major factor for cognitive aging, both cardio aerobic and resistance, because they both increase brain derived neurotrophic factor or Bdnf.

So picking that up early, that's when you want to prevent call sign results, when you want to prevent that accelerated decline. And that's that's the stuff that you start picking up in 40s, 50s and 60s, not 70 pages, 90s.

You want to start picking up earlier than that, particularly if your genetic testing tells them whether or not they have an Apple lipoprotein E for a Leo versus A3A Leo.

Cognitive Aging and Brain Health

I mean, that's one of the most highly characterized and, you know, known, potent, or what they call it most penetrant. Mutation that that causes, cognitive decline in Alzheimer's disease.

You know, somebody has that, you know what, don't wanna be involved in contact sports head trauma. They don't they don't get as well, they don't recover from as well.

The benefit of alcohol, even one drink a day. That may be good for some people. Cognitive functioning is not so good in them. So, you know, knowing those sorts of things, picking them up early.

But, yeah, I mean, talking about aging from the head down, I mean, it's it all starts up here because that's where behaviors, come from. And getting your behaviors right, getting your sleep. Right.

All that's going to affect everything from the neck down so that that wave of Alzheimer's that you're worried about, you know, it's not that people have changed.

You know, we we understand a little bit about the genetics of it. So, like you said, HPV, even Bdnf and a few other things that you can point to. Insulin resistance.

You know what? So what what concerns you? What's going on that makes you think that that's that this is coming? Well, so because the things that used to kill people before they got Alzheimer's disease are not killing them anymore.

So the advent of preventative strategies and cardiovascular disease, revascularization, either through, you know, stents or bypass surgery, people are dying of heart attacks as much, they're not dying of heart failure quite as much.

And so we got to diet something. And, and Alzheimer's is one of the later ones. But if you're not dying of that, and then we're doing screening to prevent you from dying from cancer, the some of the common cancers, the the brain, is going to be the major.

The prediction is that numbers are going to go up exponentially because of the fact that, and I don't know whether they're, you know, people talk about toxins in the, in the environment and they certainly may play a role, you know, molds and other bio toxins that, you know, the, the that they can cause inflammation.

But I think by far and away the most important factor is the things that used to kill people. Don't kill them as much. And so then that organ system, which had a fair amount of reserve built in it compared to the coronary arteries of people who have, you know, predispositions to it, it has a little bit more, for instance, you know, your lungs have a lot of resources, organ reserve.

You're not going to have a, any kind of tsunami of emphysema or COPD killing people because the lungs have a

lot of design, overbuilding. Likewise, in the kidney, you can give away a kidney and you can still live to a normal age, but the brain is, you know, a little bit has a little less reserve, although certain people, like if you have an apple lipoprotein E2, then your chances of getting Alzheimer's are considerably decreased and your cognitive function stays very high.

So that's I think, probably one of the major reasons, that it occurs, women are living longer after menopause without any estrogen. And estrogen I think is very important for brain and function, for brain function.

So, I mean, I think that's probably the main reason for the tsunami just not dying or something else. You got to do something. Yeah. Okay. So then when people work with you at your clinic, it's just like, just for the sake of everyone listening.

That was probably thinking, well, how do I how do I get involved in some of this stuff? Is it like a a membership or do they can come and roll with you or even available?

How does this all work? Yeah. So in my practice, patients come in for an initial evaluation or initial consultation, and we do all the markers, both blood and non blood.

And, some of the ones we talked about, to look at your overall functioning and then, you know, some people come in at a relatively young age, oftentimes they're sent in for by their parents who are patients of mine to get a baseline evaluation.

That's always a good idea to know where you are, because, again, from a telomere standpoint, if you be like a be 40 and have live as a 20 year old or be 40 and have hundreds of 70 year old, and likewise for other organ systems.

So it's a good idea to get a baseline early on to know what the weak ones are, that you could potentially do some things that may just be lifestyle and I'll say, you know, do this, this and this and then come back in a year or maybe in two years.

And we'll, you know, keep on tracking you. The average age of my patients, about 50. And so at that point in life, typically there are things going on.

And, you know, we apply some therapies either supplements, lifestyle diet, hormone optimization, telomerase activation, various other things. And then they go on, basically a subscription, program where they pay monthly to be a patient here.

Right? Okay. You maintain their health with all the modalities that we can. And that's my job is to keep them functioning as well as long as possible.

So it's a blessing that things like that are available. But there's a lot of people that want to take charge and don't know where to go. You know, they're stuck, waiting to get sick to come to the doctor.

But there's ways to get out of it. And then so in that regard, how do you speak with sort of other clinicians when you have to refer? I mean, I'm thinking about the the patients perspective.

If somebody says, yeah, I want to dive in, I want to take care of my health this way. But it's not only you they have to deal with, they have to deal with other people.

How do they get them to sort of embrace and start thinking in this way? Because I've seen that's often a challenge to the care team as opposed to just the individual, you know, what do they do to to spread that culture?

Yeah, it's it's definitely a challenge. If you've absolutely pointed to something that is this is a challenge that I face daily because, a lot of physicians haven't made that paradigm shift in their approach.

They don't see aging. You know, the dictum is premium. No, no, no, first, do no harm. But that's if you assume that

the aging process is harmless. It's not, you know, it's if you do if you do nothing, then things are going to get bad.

So my job is to communicate with the patient in a collaborative way and with their the patients physicians. What the risk benefit equation is in that patient.

And it's different at different stages in life. But you know, and the other, you know, good thing is that because of the model that I have, I don't have a huge number of patients.

And I have the time to have those conversations with the doctors and try to educate them about why I'm suggesting this therapy or suggesting that they not do a therapy that they're suggesting, and show them what the evidence is for that and what, you know, the markers are that we have on the patient, that they may not be looking at that show why that may be a better route to go than, than the way in which they're suggesting.

So, it is a challenge, but it's so it's a sort of an opportunity for, a teaching moment. The, the could spread the word of a, a new way of approaching health care that I think is I always take as a, as a good opportunity.

And, you know, I just thinking about, you know, other people that are in this space, I remember recently listening to a podcast from David Sinclair who I'm sure you know, and somebody asked him, yeah.

What's the number one thing you should do? What's it like if you want to just focus on one easy thing? And he said, well, I eat one meal a day, I fast, I intermittent fast, and he's beyond intermittent.

It's not even a eight hour eating window. It's literally one meal a day. He's eating and he takes, quercetin and nmn and every day in the morning with like some fat, some olive oil or yogurt to help absorb.

And he said, if I would tell anybody anything, that's, that's the easiest and sort of most impactful things. I don't know what your thoughts are on on that.

Like in terms of the intermittent fasting. Yeah. Well, so I think, you know, one thing I should say, which might be interesting to your, your listeners or not, but I think this is part of what's so fascinating to me about this field is that if there's a, there's a quote from, a famous geneticists, Theodosius Stubbs fancy that said, nothing in biology makes sense except in light of evolution.

And so you really have to look at what we evolved as a species from. And it's only in the last 10,000 years that we've been in this kind of lifestyle and really, right last couple hundred years that we've been the current lifestyle and humans evolved to be in the fasted state quite a bit of their waking time and sleeping time as well.

I mean, we didn't have food available to us all the time.

Fasting, Nutrition, and Longevity Tradeoffs

If you look at primates, you know, gorillas and, and chimps and chimpanzees, they don't have a lot of fat on their body because they've always been in the they've always been around food sources.

But we migrated out of that ready food source. We learned to store fat, but we also need to be in a fat. We also learned to be in a fasted state. And so I entirely agree with him.

I mean, I wouldn't say it's the easiest thing to do, because one meal a day is not that easy for some people, although the more you practice it, the easier it is.

But yes, I think we're a by far and away and overfed species that our bodies are much better off. You know, you get into the autophagic state when you're not eating, you're cleaning up the junk in your cells.

It's very healthy. I can tell you that the patients in my practice who do practice, omad, which is sort of the acronym for one meal a day, are super healthy.

Their hemoglobin A1 C's are like under five. Their body fat, particularly their visceral fat, is usually under, you know, in the elite range. And they find that they're very clear in the times that they're, you know, in the fasted state in terms of their, their thinking.

So I think it's it is quite, beneficial if you can do it. I would say it also just takes a little while for your body to get used to, maybe go with time restricted eating for a while, you know, a 16, eight hour, you know, a 14, ten hour, sort of window and then try to extend if you're not hungry sometime that dinner, just try to extend it into a 24 hour fast.

That's the sort of one meal a day type thing. But the more you practice that, I think, as long as you're getting good nutrients, and getting a, you know, a high quality, high nutrient dense diet in the time that you are taking food in.

It's a great thing as far as in a man, that's his field of the research. I think that it's a very promising molecule, and precursors are promising. But you know exactly what they do in the long run.

I mean, I take them, but exactly what they do along with, I think, probably a little less worked out than, than, you know, the intermittent fasting, you know, and then the set of lytic sets, a whole nother kettle of fish that we can get into at some point.

I would, I would add sleep to that probably. And you do sleep better when you're, you know, don't have food in your stomach and just been, you know, at least 3 or 4 hours before you, you go to sleep.

So those two, those things are sort of some of the biggest things and are the basis of the kinds of things that we tell our patients to do as a bedrock of their, of their program.

And for people that are, you know, one of the things that, I'm sure you and other clinicians tell people, you know, what it is to be, to have vitality.

It's not all about aging and being old, but being, you know, climbing Mount Kilimanjaro when you're old, you know, you need to maintain a certain amount of muscle.

So there's some people say, well, how do I eat one meal a day? But also, you know, stay in the fitness sort of range I want to be in. Can they take in 100g of protein in one meal?

Does that make any sense? Or how do you do that. Yeah. Well, so you can I mean typically people do one meal a day. It's a it's it's grazing kind of thing over about three hours or so, you know, sit down and shove a whole day's worth of calories down your, your throat in an hour.

Okay. That's uncomfortable and and not the way most people practice it. So, you know, the patients that I have and what I've done is sort of, kind of have a few appetizers work and some protein, and you can get 60, 60g of protein, 100g of protein.

You know, you probably don't need 100g of protein unless you are, you know, in a growth phase. And that's the other thing that, you know, that is a, I think, a fundamental, sort of balancing act that you have to do in longevity versus performance.

You know, the growth phase is when mTOR is active, is when IGF one is doing its job. You know, those are that's how you build muscle. That's how you build, you know, new skin, new organs, etc..

Right. That's the opposite of what happens during fasting. And these other, you know, kind of fast mimicking diets and these other, set of lytic therapies. So knowing when you're in a growth phase versus, I mean, I would try to be in one meal a day when you're trying to put muscle on, that's going to be tough.

Yeah. Like do a phase where you're putting muscle on, and then letting your cells clean up, doing some autophagy, shedding some of the fat during the other times.

I think that's probably a better way. And more work needs to be done to figure out protocols that work, you know, best and and how they work. What are the best markers for looking at it within individuals and and those, those those kind of markers are being developed, you know, looking at analytic, effectiveness of analytics, senescent cell burden, that sort of stuff.

I think, is is a challenge because performance versus longevity, there's there is there's a little bit of a trade off there. And I think that that's something that needs to be kept in mind.

And then particularly. Yeah. So I, you know, I just saying that there's so particularly what was it. Well, I was particularly with regard to exercise, I mean, you know, the endurance athletes and even, you know, bodybuilders, I mean, they're a lot of what happens there is when you do it to that degree is not good for you.

I mean, if you're looking for longevity, if you're, you know, running. 50, 100 miles a week, you know, and lifting very heavily. That's, that's asking a lot of your body.

And there are markers like the glycan age marker, which you may be familiar with, looks at the patterns of sugars attached to your antibodies, your IgG antibodies.

They've shown that these athletes, these ultra endurance athletes, their glycan ages are older. They're they're in a more inflamed state. And, you know, if your goal is, you know, being as functional as possible or as long as possible, that, you know, that may not be a great idea.

Yeah. No, that's that's awesome advice. And it's it's pioneers like you that are driving, you know, these new layers of science and stacking them on to what we can get at our doctor so that we can get better.

And, I want to thank you. This discussion was awesome. I'm sure everyone's going to be very happy with what they learned, you know, and it's it's hard to find a mind like yours that has so much jammed in it that we can extract and talk about.

So thank you again for joining. This was a pleasure. It was awesome. Thank you guys. Anytime. Good talking to you. Take care.