

**THE MODEL
HEALTH
SHOW**

EPISODE 381

**Why We Age And Why
We Don't Have To**

With Guest Dr. David Sinclair

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Shawn Stevenson: Welcome to The Model Health Show. This is fitness and nutrition expert Shawn Stevenson and I am so grateful for you tuning in with me today.

I've got a question for you— who was your first crush? Who was your first crush? For me, it was a character on the TV show Punky Brewster, her neighbor named Cherry. I was a vibe in Cherry big time.

But then, that's the celebrity crush I'd say, but in real life, my first crush was Shirley. Shirley was 16, I was like 8, I had no business having a crush on Shirley, but I remember Valentine's Day I went to the store, I had like a couple of dollars, I bought Shirley a chocolate heart box, the box you open it up, you got the assorted chocolates that could be delicious chocolate goodness or it could taste like toothpaste. You never really know, you know the box I am talking about.

And there was a thing going on at the rollerskating rink, she was a friend of the family, of my extended family, my auntie Jannet. So she was like a friend of her family. And so everybody was there at the skating rink, I presented her with the box of chocolates. She gave me a hug. She embraced me. It was beautiful.

But then, a while later, Shirley was skating with another fellow. All right, another 16, 17-year-old and I was ready to fight. But after I wiped my tears of having my crush crush my heart, I realized like, "Hey, there's a lot of other fish in the sea, there's a cherry out there for each of us," individually, of course. I met my cherry and I'm married to her today. Shout out to my wife Anne. And even this story, babe, please understand I was very immature, okay. So that's why we are talking about these other young ladies.

But my point today is that we've got somebody who's been crushing on longevity for many years like this was his boom, this was his pie in the sky, his dream love was to figure out and crack the code of human longevity. And he is deeply immersed in the science and he's just one of the most fascinating people who's been studying this, but also somebody who is very skilled at translating

the science behind aging.

And so today we're going to talk about why we actually age and what's going on behind the scenes. And it's a much bigger story than what we've been talking about in the past. There are certain symptoms of aging that we can address and as we address those things we can improve our lifespan, and more so improve our healthspan, that's what we really want.

We don't want to live a longer life just to lose function and the ability to enjoy that life. We want to live longer but also be able to experience health and vitality, so that's our healthspan. And so that's what we're talking about today as well, and so I'm really, really excited to dive into that.

But for me, also, we think in terms of nutritive aspect and we'll talk about some of this in the show as well because obviously, that plays a part in what he talks about in his research, but for me, it's the longevity of my brain. And there are these categories of nutrients that he's going to talk about called, they fall into this category of things that express Xeno hormesis. It's a slight stressor, this plant food or these various types of food that makes you better.

And I think there are many of these categories of medicinal mushrooms that have some of those similar properties that's why like 30 percent of drugs are based on various types of fungi. But it is just taking a broader perspective and knowing that a lot of our medications are even coming from this category of things that cause stress, stressor to the body that the body adapts to and comes back better.

And so for me, even today, I had a Lion's Mane coffee. And so Lion's Mane is a medicinal mushroom that the University of Malaya found to be neuroprotective and also has a capacity to cause something called neurogenesis, so this is the creation of new brain cells. And this is very difficult to come by, right.

When I was in my conventional university setting I was taught that you get some brain cells when you're born and pretty much you just go through the process of losing them throughout your life and that's the end of the story. We know well and good now that there are parts of the brain, different areas of the brain that can regenerate and create new brain cells throughout our entire life, like the hippocampus for example.



There are certain nutrients that encourage this process and Lion's Mane is one of those. And so I had it together with organic coffee in the Four Sigmatic medicinal mushroom coffee blend. And this is where I really turned to for this incredible category of medicinal mushrooms because they do a dual extract of the mushroom. So this means that it's a hot water extract and an alcohol extract, so you're actually getting all of the nutrients from the medicinal mushroom you might hear about in studies like this.

Because when you hear or read a study like this, you have to think, "Okay, what was the extraction method that they got this nutrient profile from?" Because it might be something different than what you're buying, right? And so Four Sigmatic solves that problem, it's like a dream for me because prior to them being on my radar I used to buy company X's hot water extract medicinal mushroom, then I buy company Z's alcohol extract and then I open some capsules and I put the tincture into the blender together like I'm making all this.

Now I can just get my packet, instant packet, single-serving packet of Four Sigmatic coffee, add some hot almond milk or hot water, a little high-quality fat, whatever you're into, it might be a little coconut butter, it might be a little bit of grass-fed butter rich in CLA, it might be ghee, so many different options; a little high-quality fat and maybe you want to sweeten it up a little bit with some Stevia, I don't know it's your party, it's your prerogative.

But for me, that's how I like to start my day. And if you haven't done so yet, make sure to pop over there and check them out, get yourself some Four Sigmatic, I promise it is going to be a game-changer. It's FourSigmatic.com/model, that's F-O-U-R-S-I-G-M-A-T-I-C.com/model, you get 15 percent off. Exclusive with The Model Health Show. All right, so pop over there, check them out, foursigmatic.com/model. Now, let's get to the Apple podcast review of the week.

iTunes Review: Another 5-star review titled "My health and wellness go to". by Ze Chatty Kathy. "I am so blessed to be enlightened after each episode. Thank you for all of your dedication and hard work, keep the episodes and funny anecdotes coming."

Shawn Stevenson: Awesome, Ze Chatty Kathy, I love this so much, thank you so much for sharing that over on Apple Podcasts. And listen, if you have to do so please pop over to Apple podcasts and leave a review for the show, it means so much to me. And just keep the goodness coming and I promise to do the same. Alright, and on

that note, let's get to our special guest and topic of the day.

Our guest today is Dr. David Sinclair and he's a professor in the department of genetics and co-director of the Paul F. Glenn Center for the Biology of Aging at Harvard Medical School. And this is where he and his colleagues study the molecular causes of aging and how to improve healthspan and lifespan by slowing its effects.

He's also the co-chief editor of the peer-reviewed journal "Aging" which I've cited many different times in my different episodes of the show and also in my writings. And he has co-founded several biotechnology companies and he's an inventor of 35 patents. He was listed as one of Time magazine's 100 Most Influential People in the World and Time's top 50 in health care.

And his new book is out right now, it's called "Lifespan: Why We Age - And Why We Don't Have To." And now we're going to jump into this conversation with the incredible Dr. David Sinclair. Did you grow up in Sydney or were you like in the country, like a little bit I was reading about that?

Dr. David Sinclair: Yeah, you'd think it was in the country, but actually Sydney was greatly expanding when I was a kid and we were on the frontier. Now it's basically considered downtown, but in those days there were cows and windmills right on the bush with all the flora, fauna right there, the deadly fauna was right there.

So we grew up thinking we were going to get bitten and could die any day, we'd worry about our shoes and swimming pool had funnel webs which can kill you sitting in the bottom. You don't touch those because they looked dead but they're not really.

Shawn Stevenson: That's creepy.

Dr. David Sinclair: It was a fun childhood. I thought that was normal, all kids think they do. But now I realize that you can live in places where there's no threat of dying. Manhattan's probably more dangerous though.

Shawn Stevenson: Right, exactly. It's different threats.

Dr. David Sinclair: Yeah, those scooters.

Shawn Stevenson: Those birds we've been by, yeah. I've shared this on my show before, but I would spend many of my summers with my grandmother in like the rural part of Missouri, and it's like a gravel road to get to her house and we'd swim in the creek and there's like fish, like we got to, everybody bails out when you see a snake in the water because it's just a thing that happens, you know.

And then today, like I'll see my son just flip out if a bee comes their way, right. It's always just that exposure you know, and like you said, there are different types of threats but I think it's such a great childhood experience to be having so much access to nature life.

Dr. David Sinclair: I took my family back to Australia to go camping because I used to do this a lot and they're just city kids in Boston. And I said, "I'll go swim in that little lake," and they came running out covered in leeches and now they don't go camping with me anymore.

Shawn Stevenson: Oh my gosh, was it that movie "Stand by Me"? Was that the movie?

Dr. David Sinclair: Yeah, down his pants, that was great.

Shawn Stevenson: Yeah, oh my gosh, no thank you. But with that said, what was that triggering event that got you interested specifically in science?

Dr. David Sinclair: Well my parents were scientists and so they would talk about blood samples and poop samples and urine at the dinner table, this was normal. "Oh did you see that sample, oh man, that poop was really green and mucoid." And I thought that was fun. I do love understanding things that people haven't ever figured out before, I'm an explorer, but right now of the molecular world.

And so with that, the other thing that happened was my parents worked at the same company which was a pathology company, so they had at work buckets of dead people, dead pieces of people. There was one particular thing, there's was a bucket with a leg in it, a big trash can.

And we would go to my dad's work and I'd say, "Can we see the leg in the bucket?" It was the leg in the bucket, and so that kind of thing. But I also always wanted to pull things apart, figure out how they worked. And I used to pull things apart, cars, computers but I think that the body is the most complex and

interesting machine in the universe and I've enjoyed pulling it apart molecularly to figure out how it works. Putting it back together is the hard part.

Shawn Stevenson: Absolutely, right especially with the body. Yeah, that's so fascinating. I was just thinking literally 2 days ago, my son and his friend the next-door neighbor, we were having dinner and they were just cracking up talking about poop, it's just, it's so funny.

But this is a broader context and even seeing the value in this conversation and the nuances, and the leg in the bucket, that's really interesting. But this leads to the question— so you grew up around science and the talk of science, but what specifically sparked your mind to be, to have this idea that we could extend our lifespan?

Dr. David Sinclair: To me it's plain, it's obvious, it's in plain sight. And what I'm trying to do with my life is to shake the world up to realize that we don't have to accept what we think is inevitable. And so the mantra in my lab and in the book that I wrote is "Nothing is inevitable." And the problem with aging is that we accept it because it's so common, we see everything around us get old and we say, "Well, maybe we just have to accept it."

And it was my grandmother who taught me that that didn't have to be the case. She raised me because my mother was working and she was young, she had my father when she was only 15. Going back to the 1930s, that was a big deal, she was kicked out of high school. But she came to Australia, ran away from Europe, from Hungary and raised me and her view was "Adults screw up everything," because she'd seen what happened during the war and afterward.

But she was a huge rebel, she was the ultimate rebel. Our 16-year-old daughter has the same genes so it's tough raising her. But the attitude when I was young was "Rules are meant to be broken." So she would, she taught me and the police probably will remember a few of these things, she told me, "You don't have to wear what people say you have to wear," so she was kicked off on that beach for wearing a bikini which in those days was illegal.

She used to drive like a maniac, not speeding so much but to drive like this looking around and dance to the music so the car is going like this to Beethoven's 9th and that kind of thing. So I have grown up saying, "We don't have to accept the way the world is. Adults screw up everything".

But she also was a humanist, she wasn't religious but she said, "David you have to do the best you can to leave your mark and allow humanity to reach its potential and not let others screw it up." So I've spent every day doing that.

But why aging? Because to me it's obvious, this is the biggest unsolved problem. If aliens came down to see us and judged us as a species, they'd say, "Pretty good on atomic theory, quantum mechanics, but this aging thing, you don't even realize it's a problem that you can solve, we figured that out 50,000 years ago, what are you doing?" And that's what I'm trying to do here with the time that I have.

Shawn Stevenson: Yeah, and you said in the book and it was very jarring to see you know, you said that there is no biological reason for us to age. And in fact, you said that aging is, and you approach it as being a disease.

Dr. David Sinclair: Well it is a disease, It's just, we can call it whatever we want, but what is a disease? A disease is something that happens over time, that causes you to have a disability which you know well. And it causes frailty and eventually can cause death. That's aging, right? Is it not?

So what's the difference, why do we separate disease from aging? The only difference is because aging happens to more than 50 percent of us, and that's a crazy distinction. I would say that that's even more important that we focus on research development policy on actually what kills most of us.

Shawn Stevenson: This is really fascinating because for me, just you bringing up the conversation the way that you did, I realized that we know pieces of aging, what it looks like. And we're tempting to address different pieces but there is no unified theory of aging, as you pointed out. But there are these characteristics of aging that we're all trying to attack.

Dr. David Sinclair: Well that was true a few years ago. What I have put forth in my book is a theory that I think can explain why we age and explain why all these other things happen. Now we scientists, we love to put things into categories and we came up with about 7 or 8 causes of aging, we call these the hallmarks.

I don't want to get too carried away, we call them Hallmarks. And we've been very satisfied for the last probably 8 years that this is the roadmap to extending



lifespan, if you can solve or treat each one of these 8 then we'll live longer. Now that I have no qualms with I think that's true. But that still begs the question—what causes those to happen?

And so my theory, I've called it The Information Theory of Aging, if you boil it down to an equation if you want, it's first principles, I think aging is a loss of information. And that's what's causing the problem. So what we need to do is preserve the information and see if there's a back up hard drive of youthfulness that we can tap into and reset our computers.

Shawn Stevenson: This is so fascinating. You specifically, this is a great segue into looking at the digital nature of DNA. When I read this in your book, it really does flip the switch for me, because there's a digital aspect and then when we're talking about our genes and our gene expression there's an analog aspect. So let's talk about this digital aspect of DNA.

Dr. David Sinclair: Yeah, well this is the crux of everything and most scientists don't talk the way I do, we've had to invent our own vocabulary and metaphors. So DNA we're all very familiar with, without DNA that we get from our parents, we're screwed right, without the ability to encode proteins and run the cell, it's important.

But that information is much more robust than we realize, we think of it as this very fragile chemical, it's actually not fragile you can boil it, you can find it in fossils, it's pretty strong. So this is robust. And it can certainly last 80 years, a life span, it can probably last a 1000 years if we're good to it.

So what's the other problem? So that you said that's the digital part of the genome or the information, so there's ATCG, okay, people will remember from high school days if they're not biologists it's just a digital code encoded in chemicals for them.

And instead of being as ones and zeroes it's just 4 letters. But there's this other type of information that is just as important for our survival, and that's the epigenome. So what's the epigenome? That's a complex word for the control systems that control the genome in the way that, forgive my anachronism here, but the DVD is the digital information and the analog is the ability to read that, so the digital the DVD player is analog.

So it's moving around and it can move in any possible direction. What does that



mean for the cell? Well, what's actually literally happening is that as we develop as embryos we're spooling out parts of DNA in every cell, differently in every cell. So if your nerve cell at this part of the brain is developing, you let this big loop of DNA and those genes will stay on for most of your life, if not all.

But there are parts you don't want, you don't want a liver gene on in the brain so it spools out very tightly like you would a hose reel and that keeps these genes off, hopefully for 100 years or more. But what I'm proposing is that insults to the body and if our body becomes complacent and you know there are good things we can do to our bodies.

What we lose is that structure, these loops and these tight bundles, and those fall apart, we can see that in our studies. And we can actually measure that and it's a clock, it's a clock of aging, if we measure those loops and the changes to this epigenome, I can actually tell you how old you are biologically and I can predict with high accuracy when you're going to die, almost to the month.

Shawn Stevenson: Wow, that's nuts.

Dr. David Sinclair: Scary, right? I haven't had it done, would you get your clock done?

Shawn Stevenson: This is just a little sidebar here, but this brings to mind the science behind telomeres and measuring that is its biological marker, But there's more, there's much more to it, that's just one aspect.

Dr. David Sinclair: Yeah and what's comforting about this theory and it's the mark of any decent theory, is that it should be able to explain not just one aspect but all aspects of a very complex system. And aging is the ultimate complex system and we've also got 1000 years of observation that we have to explain.

And if it doesn't explain half of it through the theory out but as I've described in my book the theory does actually explain everything, even telomeres loss, telomeres are the ends of chromosomes that wear down over time. The epigenome, the proteins that package those loops and those bundles are also packaging the ends of the chromosomes.

And the unraveling leads to an acceleration of that loss as well and actually the factors that stabilize our epigenome and we work on some of these they are called sirtuins we worked on them for 20 years, we can activate them by being

healthy. They are involved in protecting the ends of chromosomes as well and bundling them tightly so they don't erode and cause aging to happen as well.

Shawn Stevenson: Yeah I want to talk about these sirtuins, this is really, really fascinating. So is this under that umbrella of what you're calling longevity genes?

Dr. David Sinclair: Yes.

Shawn Stevenson: Okay. And how many are there?

Dr. David Sinclair: Well in total there are dozens but they fall into 3 main categories that we know of. The sirtuins, there are 7 of them.

Shawn Stevenson: And we all have some of them?

Dr. David Sinclair: We better have all of them or you're dead, they're really important. But we have better copies than others, some people have variants that predispose them to long life, there's one called Sirt6 and if you have your genome we can have a look to see if you've got the right variant to live a long time.

But by the way, only 20 percent of longevity is genetic, so the good news is that a lot of it is in our hands because it's epigenetics, that's what's great about this theory is that if I'm right, genes are only a tiny part of the story. But these genes are still important because they protect the Epigenome and make sure that the DVD is read correctly and doesn't get scratches so you can read the symphony for longer.

Shawn Stevenson: This is so fascinating and I love that so much. And just to know and to have the affirmation with science that only 10 to 20 percent of our longevity has to do with our genetics and this goes back, because as I was reading before I got to this part I was thinking about the human genome project, just automatically my mind always goes there when I hear about genes and all the work that went into it.

I think it was like at least a billion dollars to try to map the human genome, but we get back like 20,000 genes when we're thinking we'll have hundreds of thousands or whatever the number might be. But the big missing piece was this junk DNA, there was all this other data that was just ignored because it didn't fit into the category of being a gene.

Dr. David Sinclair: That's right and we still, we still don't have a complete human genome because these missing pieces are very repetitive and there are also little genes that were missed by the computer algorithms in the 2000s which we in my lab and others we've gone back and we've compared humans to chimps and macaque monkeys and these little genes, there are thousands of those we think.

And with proteins swimming in our bloodstream that control health and longevity. We have a lot to learn about the genome, but what people have mostly missed is the epigenome, because that's a lot harder to read. You can read a code, that's a one-dimensional program, but to read something 3 and even 4 dimensions if you include our lifespan over time, that required another 20 years of innovation.

But we now have the tools where we can, this is really amazing, for something that cost I think is a few thousand dollars, but it's the size of a candy bar, it's about that big. In my lab we can do your whole genome instead of for a billion dollars, I can do it for maybe a couple of hundred bucks now, take me a couple of days.

But we can also now read the epigenome and tell us where those loops are, where those bundles are and also measure the chemicals that accumulate on our genome that tell us where the loop should be and how old we are, literally have old we are biologically. So throw out the candles, who cares about candles, it's those chemical marks that seem to determine our actual age and how healthy we are.

Shawn Stevenson: This is so cool. So I am thinking in terms like we need to stop celebrating our chronological birthday and celebrate these biological birthdays because they're different.

Dr. David Sinclair: Well they are, but the good news is you can't really turn back your chronological age, you can't really— well you can lie about your age. But you can, what we've discovered is, we can now dial-up aging, speed it up in animals. And now that we know how aging, we think we know how aging works, we can also reverse it. So that's what I wanted to tell the world about. Because that changes how you think about your life.

Shawn Stevenson: Absolutely, I mean, I couldn't help but think about myself. In my experience,

when I was 20 years old I was diagnosed with a condition that is usually attributed to people who are much older, degenerative spinal disease, degenerative disc disease. And my physician said I had the spine of an 80-year-old man, not a healthy 80-year-old either.

And to get that bill of goods when you're just 20, of course, it could do a big number on your psyche but he also said this was incurable, right. I've created this situation and there's nothing I can do about it. And we can get into the nocebo effect and all that stuff, but the bottom line is it took about 2 years before I decided let me try to do something about this.

And I got a scan done, it's probably been about a year ago now, and my spine looks younger than the age I'm at now, right? How is that even possible? And this is what you're talking about in the book.

Dr. David Sinclair: Well that's the power of the epigenome, you can't change your genome you get that from your parents, but you can change your lifestyle, you can change it tomorrow, and you did. You had a back brace as well? You threw that off?

Shawn Stevenson: I had a back brace, yeah.

Dr. David Sinclair: It's impressive but it doesn't surprise me. And that's what I want everybody to know and you're doing a great job telling the world is that you can change your life, you can change your health just by how you live your life, even without medicines. And it's pretty easy to do, but it's super powerful.

And the message that I'm bringing is thanks to work in my lab and dozens around the world, we've also figured out we think why these things that you're doing and people who are healthy, why they work?

Because they're turning on these defensive genes, these longevity genes that are in our bodies but they don't get activated unless we do the right things, eat the right things, eat the right time of the day, we get enough sleep, we exercise and work the right way. Then this genes come on and they protect us and they don't just slow aging, we see that they reverse many aspects of aging as well.

Shawn Stevenson: Yeah, and I want to talk about some of these things specifically but before we do, I really want to give people I think it's a brilliant analogy of our genes functioning sort of like keys on a piano. So can you share that analogy?

Dr. David Sinclair: Yeah, sure. So the genes are like a piano with 20,000 keys. And imagine there's a pianist that's perfectly young and skillful when we're young and this is our cells are able to read the right genes at the right time and place, so that's why when we get a cut, we get a cold we recover very quickly.

But what's happening is the pianist in each of our cells starts to lose her eyesight, starts to become a little bit demented and initially plays a few of the wrong keys. But if you're listening not to intently, it still sounds great. But over time what's happening is then she's losing her eyesight, she can't see the music and she's banging the wrong piece.

Eventually, it sounds like crap, and it's a cacophony and everyone's walking out of the symphony or the performance. That's what aging is. Our cells are losing their ability to read the right genes the right time because these loops and these structures that we think we can now reset. So we can actually, we then go and give the pianist or even get a new pianist or give that pianist glasses and new music and within just a matter of weeks, now we get the symphony back again. And cells work like they did when they were young again.

Shawn Stevenson: So cool. And can we talk a little bit about, so how does the epigenetics play into that whole equation?

Dr. David Sinclair: So the epigenetics is, it's brand new, so this is science that you will not really read about anywhere else. The epigenetics are laid down during development so as were embryos. One of the miracles of what exists on this planet is you can take a fertilized single cell and make a baby that comes out with 26 billion cells that all know what they are and how to work and work together.

But over time, those instructions in each of those cells, not the genes, but the ability to read right genes are lost. And that gets accelerated in part by not activating our longevity genes well. When we're young we have a lot of activity, we don't need to exercise much right? But as we get older they become complacent if we're obese, if we sit around all day.

You've written a book, I've written a book we know what happens to our bodies, they lose activity, it's brutal. And eventually, the pianist has lost her ability to play it. But what's great about what we've discovered is that you can make sure that those keys the pianist stays young, she doesn't need glasses for much

longer.

What I didn't know until about a year ago, and this is described in the book, I was writing it as we were making these discoveries, is that there's a backup pianist in our cells, every one of them that tells those loops in those bundles what they were like when we were babies, and we can access those just by turning on a set of 3 genes out of those 20 thousand that sets in motion a program to reset the entire cell.

Shawn Stevenson: Wow, this is so cool, so cool. So would the pianist be function sort of like the epigenetics?

Dr. David Sinclair: Yeah, the pianist is the epigenome. And the piano is the genome.

Shawn Stevenson: So it is determining which keys are getting played, which genes are getting expressed and which ones aren't?

Dr. David Sinclair: That's right and every cell has to do that because the nerve cell in your brain has been there since we were young and it's going to stay a nerve cell. If it starts behaving like a skin cell, we're in trouble. But that's what I think aging is. If we take an old mouse, 2 years old and we look at its skin, its skin is going to look more like a nerve cell and we have to remind it to go back to being a skin cell, you fool.

But we can now do that, we have these reprogramming factors, reprogramming genes that tell the epigenome how to restructure itself and read the genes as though it was young and cells remember what they should be doing. But old people we see, or at least in old mice we see that there are a cacophony, a mess, a melange of different cell types instead of being rigorously you're a nerve cell, get back to being a nerve cell.

And one of the amazing things that we did by resetting the eye so we use the eye as one of our test tissues, we can take an old mouse that's a year old and it's doesn't see very well, we can actually measure mouse eyesight number of ways, we can either measure the electrical impulses or we can see if they can see moving objects.

And in both those cases we can by delivering these reprogramming, epigenetic reprogramming genes, we can tell the nerves at the back of that old eye to

function again, to play the right keys, to turn on the right genes to be young, they do it, and just a few weeks later those mice can see as well as they did when they were babies.

Shawn Stevenson: That's so fascinating.

Dr. David Sinclair: And that's a complex organ, we're not talking about just skin, an eye is probably the most complex part of the body, well the brain is probably more complex, but this is a big deal.

Shawn Stevenson: I love this so much. Okay, we're going to talk about some of these activities, some of these things that have been proven to help us to access some of our longevity genes and we're going to do that right after this quick break, so sit tight we'll be right back.

Growing up if I thought about chocolate I think about 3 musketeers, I think about a Kit-Kat, Butterfinger, right. I had all these ideas, hot chocolate. Chocolate ice cream, chocolate cake, those are the things that would conjure up in my mind when I thought about chocolate.

Little did I know that chocolate itself, the original root of chocolate which comes from something that's botanically a seed, these cacao seeds were one of the most healthy foods in the world. Listen to this, this was from a randomized, double-blind placebo-controlled trial that was published in the American Journal of Clinical Nutrition found that polyphenol-rich cacao or cocoa without the sugar has a remarkable prebiotic effect on the human body.

So what the study found was that folks who are consuming this sugar-free cacao flavanol drink for 4 weeks significantly increase their ratio of probiotics or friendly bacteria. Bifida bacteria, for example, wow significantly decreasing their class of firmicutes, which is associated with fat gain, so there are certain types of bacteria that are associated with gaining fat in these firmicutes.

So the saying in health right now is that if you want to be firm and cute you've got to reduce the firmicutes, I didn't make that up, somebody else did, all right. But the bottom line is, wow it has a really powerful, remarkable impact on what's happening with your microbiome.

The study also found that it was able to reduce levels of systemic inflammation

measured by something called C reactive protein and if that weren't enough, cacao also has these compounds that have a really powerful influence on our mood, like Anandamide which is known like, that translates to me in bliss chemical right.

Serotonin and tryptophan, these precursors that help your body to produce things like melatonin, right that helps you sleep better. It goes on and on and on, but the quality matters a lot. And when you get real chocolate into something that is even more health-giving, you've got something really special.

And that's what they have with the new Chocolate Organifi Gold drink. So they've got the chocolate along with their incredible, delicious turmeric formula, and as you know, turmeric has very powerful anti-inflammatory properties. And it also has been clinically proven to have anti-angiogenesis properties, so this means that turmeric literally has the ability to cut off the blood supply to cancer cells.

And we all produce cancer cells every day, but a properly functioning immune system and being able to regulate this angiogenesis which we need, but we need at certain levels, is incredibly important and food can help to regulate that. So I'm a huge fan of Organifi, now they've got the new Chocolate Gold.

Alright, so pop over there, check it out, just released, just delicious. Organifi.com/model, you get 20 percent off that and everything else they carry. Alright, so head over there, check them out, organifi.com/model, that's O-R-G-A-N-I-F-I.com/model for 20 percent off. Now back to the show.

Shawn Stevenson: Alright, we're back and we're talking with Dr. David Sinclair and his new book Lifespan: Why We Age- and Why We Don't Have To, one of my favorite books of the year, make sure to pick this up asap. And before the break we were talking about how we've got this epigenetic pianist who can play like Liberace starting off, starting to get a little flashy with the jewels, maybe the hand motions slows down a little.

But there are ways we could say simmer down, Liberace, take a couple of the rings off or even if they're losing their eyesight, we can train them to start working like Ray Charles or something and just really learn how to play the piano at a high level again, no matter where we are.

And some of the ways to do this is what we were alluding to before the break and you go through certain phases in the book and you start off with some of the things that a lot of folks are tuned to, but you dive a little bit deeper make it make a little bit more sense.

And one of those things is obviously our nutrition. And there are certain nutrients that play a part and then there are certain ways of eating that play a part, so let's talk a little bit about each of those.

Dr. David Sinclair: Right, so part 2 of the book is about what we know and what we can do in our daily lives. And then, later on, we have a glimpse into the future but what we can do right now is pretty simple. So you mentioned nutrients, first of all, we have a theory that bears out which is eat foods that are stressed out. Which is a weird concept, right but we do it naturally, we drink, some of us drink red wine which is a stressed grape before we pick it.

We often eat colored food so spinach is a dark green food, there are blueberries which are dark. The whiter ones are not as good so why is that? Well, stressed food produces a lot of what we call Xeno hormetic molecules and I'll explain what that means. It's a terrible word we coined but Xeno means from other species and hormesis is a very important word. You've got to remember the word hormesis because every day you should think about it.

Hormesis is what doesn't kill us makes live longer. And it's a term that means you've got to get your body out of its complacency, you've got to trigger those defenses, those longevity genes. So Xeno hormesis is you don't have to only run and eat well at the right times, but you can also get these molecules from the right animals and plants, but particularly plants that are stressed.

Because when plants are stressed they're making these molecules of health for their own benefit, they're trying to survive, they are turning on their longevity genes. We forget plants have longevity genes too. So a stressed plant will make these colored molecules to protect from UV and dehydration when we eat them, they trigger our own body's defenses and you can get the benefits.

So that's nutrition, colored foods, stressed foods, organic is stressed, you don't want the perfect lettuce that's been not put any stress. And we need to do more of that, we need to let our plants stress a little bit before we eat them. And then nutrition, there is a lot in nutrition.

Now there's a debate every week about what's good. What I do is in part 3 of the book I listed out, so I truly believe that we've got to mix it up. The secret is not so much what we eat but when we eat and also what we eat should have variety. So I don't say only meat, I don't say only eat carbohydrates.

I eat a little bit of everything, I try to avoid big amounts of meat because there is one of these longevity pathways— remember I said there are 3 main ones, one of them senses how much meat we eat and amino acids. So you need to give it time to rest and settle down. So that's important. So often I'm not eating a big steak, but I will eat meat if I have worked out because our body needs amino acids. But that's it, make sure that it is actually more important than what you eat is when you eat. How's that for an interesting thing to say?

And what we've discovered with my collaborators, and I need to give a shout out to one of my friends at the NIH, National Institute of Health, Rafael de Cabo, he studied 10,000 mice and what he tried to figure out was is there a diet that makes them live longer.

And he mixed combinations of carbohydrate, protein, and fat and was hoping to see finally what works. And he found out they all did the same thing, they all had short lifespans but there was one group where you only gave them the food 2 hours a day instead of all throughout the day, and they lived about 20 to 30 percent longer.

Shawn Stevenson: Wow, love it, wow.

Dr. David Sinclair: So if there's one thing I could say that I've learned after reading 10,000 papers and studying this my whole life, it's eat less often.

Shawn Stevenson: That's so good, that's so good, wow. There's so much good news packed into that and the first thing is like you get to eat and you can see clearly with a study like that that we're debating that minutia of your macronutrient ratios right and for everybody can be dramatically different.

But what we do see across the board is that if you take whatever deliciousness you're trying to have and compact it into a shorter window of time and giving your body a little bit of a break, you can turn on some of these longevity genes.

Dr. David Sinclair: That's it, so that's the key. The take on message here is you want to trick your body into thinking times are tough, adversity, hormesis, so you can tell your body through eating stressed foods the times are going to be tough because your food supply is dying.

You can trick your body into thinking that you need to be running away from saber-toothed cats because you get on a treadmill you run or you lose your breath; or you get hungry during the day and that also tricks your body into thinking, "Wow, I need to fight back against adversity, I need to fight against diseases." And the long term effect of that, the benefit is longevity.

Shawn Stevenson: Yeah, so just to take a small step back because I know that there's— and it's so cool that you talked about this a little bit in the book, but eating is important as well, because some of us can thin this is the American way, is like a little of something is good, massive amounts of it must be better, right?

So instead of just doing an intermittent fast each day, I'll just fast forward 2 weeks or whatever, you know what I'm saying? And so but then there's this roll of something called mTOR that comes into play and nutrition is involved in that. So can you talk a little bit about this mTOR?

Dr. David Sinclair: Yeah. So mTOR is the 2nd leg on the 3 legged stool. I mentioned sirtuins, mTOR is probably the most important to get right, they will talk to each other but this is a really key one. mTOR is sensing how many amino acids are in your body, particular amino acids, Leucine, Isoleucine, branched-chain amino acids.

And if you're always eating meat, every day, your mTOR will be active. mTOR is there to grow new body parts, it's there to grow larger, taller when you're developing. The problem is if you're always feeding it amino acids and trying to bulk up, yeah you'll get great big muscles and you'll look great but the long term effect of that we've seen in animals at least, is that you're not harnessing your body's defenses, your longevity genes, the mTOR in this case you want to turn it off, you want to downplay it.

Because a low mTOR interactivity predicts longevity. And so that's why I'm mostly focusing on plant-based foods as much as I can, but when I need to bulk up and if I work out typically every Sunday then I will eat meat, but like I said, give you body a rest, mix it up.

Shawn Stevenson: So mTOR is not talked about enough and especially in the kind of conventional health circles and fitness circles. This is one of the reasons we need protein. But the great news is that a small amount can go a long way, is what I'm hearing?

Dr. David Sinclair: Well it is, it is. And you don't need to restrict everything, it's important to give yourself the ability to repair itself but if you're always in this rebuild mode, always bodybuilding mode, which you'll end up looking great but it actually comes down to vanity versus longevity.

If you only care about vanity, you're going to miss out on the longevity part. This is the trick, is to do the exercise, do the weightlifting, you need that, I need to do a lot more, but I do it on weekends. But then give your body a break. You don't want to work out hard every day, we know that. You don't want to eat 3 meals a day, we believe that's bad. And so we have to overturn what we thought which was more is always better.

Shawn Stevenson: So if we can, let's talk about this, because we talked about amino acids just thrown in there, but some of the specific nutrients, and one of them is resveratrol. And you know, we've been hearing this connected with longevity for a while, but for you to say it gave me a lot more mental credence as to its value.

And because of that we have the best people in the world here on my team, somebody who read the book and they brought in some chocolate for you that we have sitting here, some high-quality dark chocolate because of reading that that is one of the sources. For me, immediately I think back to red wine, and people is like, "Resveratrol, a bottle a day," that's not necessarily what we're going for, there are many other sources.

Dr. David Sinclair: There is. And you can have it in its pure form too, I do that because the amount that I'm taking, and I've done so for the last 13 years, is the equivalent of 500 bottles of red wine which I do not recommend for breakfast. You might do your liver. But resveratrol is super interesting because we discovered that it controlled sirtuin longevity genes.

And that was now 13 years ago. And what we've been studying ever since is how do they work and when should we eat it, and what does it do? And the good news is that 13 years ago, all we were doing was extending the life span of baker's yeast and worms and flies but now there are being clinical trials and there are products out there that are being tested on many people.

And there are clear benefits actually in these placebo-controlled trials which are essential otherwise you don't know for sure. And you see lowering your blood sugar you see improvements in liver function. And these studies finally show that what we saw in mice initially in 2006, which by the way, that study we sent red wine sales up 30 percent and they stayed up.

So, anyone who has been taking red wine, drinking red wine for the last few years, you're welcome. But seriously, what we saw in the mice was that they were protected against high-fat food, they were just as healthy against an American bad diet. And they lived as long as a healthy lean one. But that's not an excuse to just sit around on the couch and pop Resvertarol by no means.

What's often missed, even by scientists is the data that's in the back of those papers, 2 important points. One is if you take Resveratrol every other day you get the greatest benefit and we've had mice living over 3 years which is a long time for a mouse that typically dies a bit over 2.

And the second thing that we learned was that if you eat it with fatty foods, it's actually better or eat with a bit of oil, it gets into the body a lot better. And so that's why I mix my Resveratrol with some yogurt, just a couple of spins in the morning, I don't want to eat a big breakfast.

But without that, a lot of it is not even making it into your system. And there are being clinical trials that have failed, and when I look at how they did it, they were giving their patients or their subjects a capsule with water and that's not going to work.

Shawn Stevenson: It's fascinating, that's really fascinating. I never thought about that. So it has a fat soluble aspect to it.

Dr. David Sinclair: Oh for sure. it's like brick dust, chemists would tell you brick dust unless it is dissolved, it just pretty much won't get absorbed by the gut.

Shawn Stevenson: And so we know red wine is a source, what else do we have? Besides also supplements.

Dr. David Sinclair: For sure. I take the supplement because you'd to eat a lot of chocolate as well. But you know, let me just make it clear that I don't know if it's going to make me

live any longer, but I can tell you my cardiovascular system looks like it's a 20 year old's, so that's good. So so far so good. But what else can we do?

The peanuts have a little bit, but unlike a lot of things we can do in our diet, Resveratrol isn't found in huge quantities, there's only a milligram or 2 in red wine even and I'm taking between 500 and 1000 milligrams.

Shawn Stevenson: I love the fact that you mentioned the cycling aspect and this is true with so much because again, we have that some is good more is better, let me just do this every day. And I love the concept and also just the practicality of cycling nutrients because even if you just think about the way that we've evolved, we're not having the same thing every day.

Dr. David Sinclair: Yeah, and here's the great news— we used to think that calorie restriction was the way to go and we've known for thousands of years that being hungry is good for you. But we used to think that based on monkey studies and rat studies, that those animals and we would always have to be hungry, but you've got a pulse, you're allowed to eat and be full once in a while.

And that's great news because if you give mice and rats food during the day, they can eat 90 percent of what they would normally in a calorie-restricted diet, but be hungry all the time. So we can live great lives. I eat a late lunch or skip lunch but then I typically have a really nice dinner and I've actually grown to love food a lot more for that reason.

Shawn Stevenson: Wow, that's funny.

Dr. David Sinclair: You do appreciate food rather than just shoving it down during the day. But I think I live first of all a much healthier life but also one where I'm a lot more grateful for food.

Shawn Stevenson: Yeah, and I could personally affirm that experience and I remember, I mean this was over a decade ago, but I would go, this is one of the things that makes me good at what I do is that experimentation, so I would do several weeks of fasting where I'm just having juice, and I remember the, and I've shared this story before but it might be hard to believe but I didn't eat a salad like an actual salad until I was about 25 years old, that was the first time I ever had one in my life.

I was raised on like fish sticks and I was probably like 4 percent ravioli, it was just in my blood. And so eating a salad just was out of my paradigm, it was just like why would I do that? And I remember after a 21 day fast, I went and got a salad. And prior to this, just a couple of weeks before did the fast, I tried to eat a salad, went right to the trash can gagging. okay.

I got the salad and I took the first bite, and my brain was just like lighting, just like this is so good. But I was still scared that I'm going to throw up any moment. And I took the next bite and I'm just like, "This is the greatest thing I've ever eaten in my life." And I ate the whole little salad I had gotten for myself, it was at Whole Foods, just like tucked in a corner. And this is a true story, I was walking out, I threw the box away and I told a random person, I was like, "I just ate a salad."

And they looked at me like I was from another planet. They were like, "Okay." And I was just blown away at how much I appreciated eating after not eating for so long. And so having those moments even now, just intermittent fasting through the day, I totally agree.

Last night we had dinner I was really crushing it yesterday, just working, doing some stuff behind the scenes. I had dinner, it was like the best meal I ever had in my life and I've had that same food before, but it's just I appreciated it so much more.

Dr. David Sinclair: Well, I'll confess something for the first time on your show. Now that I appreciate food and I know that food is not just pleasurable, it's actually good for you, I'll go back to my old habits. And with food around that's a problem everywhere, so your reptilian brain will pick up something, shove it in your mouth and then I think, "That's in my mouth, why did I do that?" And I'll go through the calculation, "Does this meet the criteria of whether it's worthy of eating? Do I swallow?"

And occasionally I'll say, "No, it's not worth swallowing this crap, I don't even enjoy this, and if I'm not enjoying it it's not worth it." I know there are eating disorders, this is not one of those, but I'm really, I only put in my mouth now what I really want to eat. But I love it.

Shawn Stevenson: Yeah, it's fascinating. You know, just opening up this conversation and looking at the different dimensions of how it's not just the food that we're eating but



how we're doing it, when we're eating as a huge role to play, it's just, it broadens the conversation because I think we really can easily get caught up in the minutia like we talked about earlier, like trying to get your macronutrient ratios correct, that stuff matters but there's a bigger conversation.

And getting more into this bigger conversation in the book, you also stretch out and you get into conversation and things that we've got the science behind that were really counterintuitive for me, or things that for example metformin right, I want to talk about this.

I spent over a decade working in my clinical practice as a nutritionist alongside physicians to help get people off metformin and then seeing this data that you're sharing in the book, that metformin might actually be one of those, well it is, according to your data those things that can help to switch on those longevity genes. So let's talk a little bit about that, so just if you can for everybody, share what is metformin and why is this something that folks are now, who don't have diabetes are taking?

Dr. David Sinclair: Yeah, metformin is one of those gifts to humanity, it's on the list The World Health Organization has called it an essential medicine for humanity, because it's so safe, it's not perfectly safe, but it's so safe and the benefits are really clear, especially for diabetics. So there are these 3 legs to the stool, the 3 pillars, sirtuins we talked about, we talked about mTOR and amino acids.

The 3rd one is called AMPK, or AMP kinase. And this protein senses how much energy we have in the body and if we have low amounts of energy, then it'll try to make more and that's actually healthy. So you want to also trick your body into thinking it has low energy, you don't want low energy, but you can trick your body. So how do you do that?

One has to be hungry, one is to exercise and the other is to take a medicine that inhibits mitochondria and lowers the amount of energy that the cell is producing so the body goes, "Holy crap, we're running out of energy I need to try to make more." And that's good for you.

Now the side effect of that is having better blood sugar levels, so your body becomes what's called insulin sensitive, you know this, that when you're Type 2 diabetic your body doesn't register the insulin that your pancreas is putting out and it just makes more and more insulin and eventually a pancreas can give up.

But the problem with that is you have high amounts of sugar, glucose in your bloodstream which will cross-link proteins and accelerate aging and all sorts of problems, cardiovascular disease, wounds won't heal and this is truly accelerating aging, we've proven that in our field.

Metformin is shown to be very effective against type 2 diabetes and if you have type 2 diabetes your doctor will typically put you on that medicine. Now it comes from the French Lilac, it's derived from a plant so it's a Xeno hormetic molecule actually, but it's classified as a drug, so it falls into that category, so in this country at least but not all you need to get a prescription for it, which actually puts it out of reach for many people, but it also makes a lot of people wary that if it comes from a doctor it might be a little bit fishy, it might be toxic.

But it really has been shown in a study of 100 thousand people now, many studies actually, that diabetics who take metformin, in the long run, aren't just better off for diabetes but are actually healthier and protected against cancer, heart disease, Alzheimer's and frailty even more so than people who don't take metformin and who don't have type 2 diabetes. That's stunning. And when I heard that I didn't believe it.

My friend Nir Barzilai, Dr. Nir Barzilai who is the world's expert he told me that, I had to go and check on these papers which I reference in the book, it's true, so I become a real convert and about 2 or so years ago I started taking metformin.

I don't have diabetes yet, but I was on my way up, I actually met my trajectory of the last 11 years and I could see I was headed for diabetes, it's in my family. So I stocked it in to try and actually reverse type 2 diabetes. Now and I'm at no risk of having diabetes because I'm on metformin because I've made the changes in my life. Now, is it for everybody?

I think if you're young and your blood glucose levels are low you do not need it, if you're exercising and eating right. But if you're, I'm 50 now, and if your blood glucose goes up every year and you can't control that, metformin I think is a good thing to talk about with your doctor.

Shawn Stevenson: You know what and just since you just mentioned that being 50, if folks aren't watching the video on YouTube, you look like maybe thirty's, like 35. You have this, your energy is high, you're creating all these different projects, working on



different papers so you have that aspect. Your physical appearance, like you're a living proof of the stuff you talk about.

And I can see you're just getting warmed up as well. And so just a little shout out for those who listen to audio, the guy's got a dabbed in you know. But I wanted to bring this up because I also with The Model Health Show, I want to stretch our thinking.

Like I mentioned, I was looking at what can I do for these patients to help them to normalize their blood sugar naturally, right. And removing the cause oftentimes was Mountain Dew or whatever it was, just but if we eliminate those things and your body is already in a healthy state adding in these different medications potentially, again, this is just a conversation I want to get going, there might be some potential benefits.

And this is still early but it really got me thinking when I was reading the book. And one of the other aspects, I think this might go back to because, for me, I think that this competes, metformin can compete with some of the hormetic benefits of other things potentially. So can you talk a little bit about that, maybe like let's talk about exercise in that context, because it's a hormetic stressor. So how does that compete?

Dr. David Sinclair: So remember we're working with a very complex machine, our bodies. And there are these 3 legs of the stool, but we don't know exactly which ones to tweak and when, we're still figuring this out as scientists. The good news is that we live in a world now where scientists can talk directly to the public and we put out newsletters so you don't have to wait 10 years to hear it from your doctor or 20 years.

The honest truth is we don't know exactly what the best combination is and we're learning actually that sometimes you don't want to combine them at the same time, you might want to do them on off days and Metformin and exercise is a case in point.

Now what we've just discovered in a couple of papers that came out this year only is that Metformin because it tricks the body into having low energy by inhibiting the mitochondrial energy levels, if you give elderly patients metformin and ask them to do weightlifting they will bulk up both of them right, both sets with the metformin and without but the ones that didn't get

more metformin will have bigger muscles.

But not a lot, not a lot bigger, they all got bigger muscles. So it is inhibiting the growth of hypertrophy of muscle but here's what's not talked about on social media or appreciated by a lot of people— those people, those elderly people were all the same strength, even though they didn't have the same sized muscles, so it still gave them the benefits they just didn't look as bulky.

So that's where I go back to vanity vs longevity, but I think there is a way to optimize that, we don't know for sure and Dr. Peter Attia our friend he argues this with me and he also agrees at least on this point that we don't want to be taking metformin on days where our muscles are growing, that's probably the best and that's what I try to do, I skip Metformin when I go to the gym. But we disagree on exactly what the precise combination is.

But he also thinks that fasting for a long time is good and I don't know if that's true, I find it extremely difficult to go for more than one day, I start to lose my blood sugar goes too low and I've measured it with one of those monitors that you can stick them on. Fascinating, by the way, have you done that?

Shawn Stevenson: Yeah, the 24 hours, I mean just stays with you, I haven't, no, but many of my friends have.

Dr. David Sinclair: You learn a lot. And actually, I didn't have breakfast, I can feel it right now, my blood sugar levels are going low, I should eat some chocolate actually. But yeah, if I go for 3 days or a week like Peter does, he actually is turning on pathways that I think are even more beneficial. There's one called Chaperone mediated autophagy which is basically super recycling of the body's proteins. And that is something I think that he's right about and if you can go for 3 days, more power to you.

Shawn Stevenson: Yeah. I love it so much because when I made the reference earlier about some is good, more massive amounts is great, there's still, there's usually something there in the middle or closer towards that little bit, those little microdoses and having an extended fast of a few days, obviously you're going to activate more of these different beneficial processes, autophagy, and the list goes on and on. But we also have to be mindful of the longevity aspect of happiness. You know.

I think that we don't talk enough about this. First of all, and this is just



something consistent that I see, I read I don't know why I do this all the time but whenever something comes across my attention or my phone or a friend, there's somebody that lives to be 100 years old or older, I interview them, I read their stories, I read their articles and there's this consistent thread of happiness, there's this consistent thread of like meaning in their lives.

So if you're going to be pissed for 3 days and just like a crabby patty right, just mad at everybody, really it doesn't equal out for me the benefit, potential benefit that you could be getting.

Dr. David Sinclair: Yeah, that's right. So when we calorie restrict these mice in my lab they also get really crabby, they fight with each other especially the boys. So it's natural but you need to overcome it. But I totally agree that if you're not happy it's not worth it. But the key to happiness is mission.

And I just came from a conference where we're talking about how to optimize those 3 legs on the stool and one of the speakers was Dr. Cooper, he's the guy that coined the term aerobics, and he must be 100 years old, he's almost, he is in his late eighty's.

But he's had a mission in life to make people live longer and he's treated presidents the first Bush, George Bush and his mind is super quick, he's talking like this bam, bam, bam you think, you're not 80, you're like a 20-year-old in the way you talk and think and move.

Now, these are all test cases, these aren't clinical trials but when you see him, he's been doing aerobics for the last 40, 50 years. I mean, a guy like that, you want to mimic that. And what he's shown in thousands of patients that he's treated and tens of thousands of kilometers or miles that his patients have run, he can reduce the rate of aging, clearly and through the trajectory of his patients instead of the average lifespan being 80 which is what it is at best for this country, he gets them out to near 90.

So it's clearly the case that if you do what he's recommending, you eat the right way starting in an earlier age, you don't have to live to 80 you can play tennis and at 90, maybe live to 100. But wait till this new technology is coming.

Shawn Stevenson: Yeah, so exciting and that's why people have to stay connected to you to learn more about this. And speaking of mission, and I want to ask you personally,



what is the model that you're setting for other people with how you live your life personally? The way that you are conducting yourself, your business, your research, what is your bigger mission that you're wanting to express or to achieve with your life right now?

Dr. David Sinclair: Well I think it's the same as a lot of successful people, you surprise if you don't feel the same way. We know we're going to die, right? There will be a day where we know this is it, we're done for unless you get hit by a bus or something. When that moment happens I want to be able to say to myself, "I did the most I could to leave the world a better place than I found it."

And it could be a little bit a big bit, but you've got to put everything into it and I think that humanity can do a lot better, there is far too much complacency and giving up. And a lot of us just give up, they say the world can't be changed but friends of ours, we all agree that if you have a mission just pick something that you're good at and you like and never give up, that's the secret. Life's tough, it's long, if you're not driven every day to get up and do something that you love and you think that it's worthwhile— it's a tough life.

Shawn Stevenson: I love it. Can you let everybody know where they can pick up your book and also connect with you online?

Dr. David Sinclair: We have a website, LifespanBook.com So at LifespanBook.com we have a newsletter for updates, things about lifestyle, things about the new science that we've read, updates on my dad who's still going strong at 80. LifespanBook.com. On social media, you can find me on Twitter and Facebook and on Instagram pretty easily.

But we sell books on Barnes & Noble and Amazon, audiobook, actually, we recorded the audiobook in this building right here, and it's doing great, it's a bestseller, New York Times bestseller on the audiobook and the hardback. But the audiobook is special to me because we did something different, we did in between the chapters we had chats about how we wrote the book and how we thought about designing the book, so that's an extra free bonus for people who get the audiobook.

Shawn Stevenson: Perfect, perfect. Thank you so much for sharing your time with us today and thank you for putting together such an epic treatise on longevity. And I think that this is something that we just really haven't seen before.

You weren't afraid to get into the science, you did make it understandable but this is a little bit more science-heavy than what publishers would typically allow. But the stories, even like you articulated with the pianist example like it really brings it to life and I just really admire that, so thank you, man.

Dr. David Sinclair: Well thanks. You won't read it anywhere else because it's science right on the cutting edge, but it also, it will change the way people think about their lives and what's possible. And you are an inspiration, Shawn, I appreciate it.

Shawn Stevenson: Thank you, thank you, I receive that man, thank you. Thank you for coming and hang out with us.

Dr. David Sinclair: Any time.

Shawn Stevenson: Awesome. Everybody, thank you so much for tuning into the show today, I hope you enjoyed this as much as I did. Make sure to pick up a copy right now of Lifespan audiobook, physical book whatever floats your boat, definitely pick this book up and absorb the information.

And today we covered a lot of ground and we talked about the actual process behind the scenes with the aging right, there was no unified theory of what that looked like. We know it's some of the components of what aging looks like, but to really dive in and to start to look at aging as something that is not an inevitability per se, and instead, he said in the book and it just shook me like aging is actually a disease.

And I was like, this guy's onto something and it's ruffling my feathers but I got to read more. And as I dug deeper into the book and into the research, it just affirmed so many things that we're up to and that we've been talking about here in The Model Health Show for many years but it also takes things to another level and that's the most beautiful part is that there's always more, there's always another level.

And our understanding of the human body, we're really just scratching the surface. In the past decade through what we've learned is a light years ahead of what we learned in the previous 100 years like this stuff is speeding up, we're getting smarter, faster and there are a lot more things to take advantage of.

But what it boils down to it is just getting yourself around this information, pulling in and taking advantage of the things that feel good to you and enjoy the process, right.

And also, and I'm so grateful that he talked about this is getting ourselves tied to something bigger, to a bigger mission and really pulling in what is that for you and I think he gave a great example of how to do that but also just referencing back to an episode we did recently with Jay Ferrugia, just each day set out to make other people feel good, find a way to be of service.

That can really help to guide us to a more meaningful life in and of itself. And I hope that I added some value and brought some service to you today and if I did, please share this out with the people that you care about on social media and of course, you could tag me and tag David and just let everybody know what you thought about the episode. We've got some powerhouse stuff coming your way very soon so make sure to stay tuned. Take care, have an amazing day and I'll talk with you soon.

And for more after the show make sure to head over to themodelhealthshow.com, that's where you can find all of the show notes, you can find transcriptionist, videos from each episode and if you've got a comment you can leave me a comment there as well.

And please make sure to head over to iTunes and leave us a rating to let everybody know that the show is awesome, and I appreciate that so much. And take care, I promise to keep giving you more powerful, empowering, great content to help you transform your life. Thanks for tuning in.