THE MODEL HEALTH SHOW

EPISODE 683

# The Truth About Gut Bacteria, Parasites, & What Your Pooping Habits Tell You About Your Health

With Guest Dr. Tim Spector

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**SHAWN STEVENSON:** Welcome to The Model Health Show. This is fitness and nutrition expert, Shawn Stevenson, and I'm so grateful for you tuning into me today. We have trillions, tens of trillions of bacteria living in and on our bodies. Today, the gut microbiome is getting a moment in the spotlight. But it's not just the microbiome where we have these bacteria living, we have a microbiome of our lungs, we have a microbiome of our skin, and on and on and on. We're now discovering that different organs and organ systems have their own bacterial make-up. But to take this even further, it's not just bacteria that have this symbiotic relationship with the human body and human health. Viruses, we now understand that we have a virome, the human virome, that also contains tens of trillions... No, scratch that. Hundreds of trillions of virus particles potentially. And to take that a step further, we have a microbiome, this is a cascade of different fungi that inhabit the human body and have been found to have a symbiotic relationship with our human cells. We also have lesser-known microbes like Archaea.

But another one that might put a sense of alarm in your body are parasites. That's right, parasites have existed within human bodies forever, forever. Now the question is, are these things all foe, or can some of them actually be friendly? That's what we're going to be talking about today with one of the leading experts in the world in understanding the microbiome and education around the microbiome, Dr. Tim Spector. Now, when I say one of the leading in the world, I'm talking about, he has the biggest database of doing identical twin studies and looking at how differences in the microbiome makeup of people who are identical, we're talking about individuals who share the same genetics, the exact same genetics, but having different health outcomes when it comes to diabetes, when it comes to obesity, when it comes to heart disease, when it comes to depression.

And the clear difference that stood out in Tim's research is the difference in the microbial make-up. And I'm really looking forward to this because I've actually been studying Tim's work for years, I'm even cited some of his work in one of my previous books. And so, he's come in from the UK to sit down and have this conversation, and we're going to really unpack the true impact of our microbes on our health. But you're also going to find out some really profound insights about how we experience food, how we interact with our food, both our human cells and our microbial cells, and how things like our sense of smell are actually tied to our lifespan.

So, there's so much in store, and I think you're really, really going to love this conversation. Now, through this episode, he actually briefly mentions a beverage that humans have been drinking for countless centuries that has kind of gone in and out of favor as far as being something that is potentially helpful to human health or potentially something that can degrade human health. But his compilation of data is now clear that there's something really

remarkable about coffee. As a matter of fact, a meta-analysis of 40 studies published in the European Journal of epidemiology, which Dr. Spector is an epidemiologist by training, revealed that regularly drinking coffee was associated with a lower risk of death from cardiovascular disease, from certain types of cancer, and from all-cause mortality. So, a reduction in risk of death from everything. Although this is a notable association, again seen in a meta-analysis of 40 studies, the researchers did adjust for a variety of confounding factors like obesity, age, alcohol consumption, smoking status and more, and still found that drinking coffee stood out as a strong element of longevity.

Another study published in 2021 in the journal, Nutrients, tracked over 1500 test subjects for 18 years to identify the impact of coffee consumption on mortality. After compiling the data, the scientists found that drinking one or more cups of coffee per day was associated with a lower risk of all-cause mortality versus not drinking coffee. A lower cancer mortality was observed among drinkers of more than one cup per day, compared with non-coffee drinkers as well. So, there's an anti-cancer effect, there's a cardiovascular protective effect, and there's a longevity connection when we're talking about coffee consumption. Part of it has to do with its anti-inflammatory capacities.

As a matter of fact, researchers at Stanford found that coffee can actually shift our genetic expression and actually down regulate genes that are related to inflammation. So, there's an epigenetic influence of coffee, so we're talking about nutrigenomics, and how certain nutrients impact our genetic expression. Really remarkable stuff. Now, this comes with the important caveat that coffee is also one of the most pesticide leading crops in our world today as well. So, if you're drinking coffee, you better make sure that it's organic, not just that, let's take it a step further. Let's get high quality organic coffee plus, have it infused with storied, science-backed, medicinal mushrooms, like lion's mane.

Researchers at the University of Malaya have discovered that lion's mane actually is neuroprotective and could potentially stimulate neurogenesis in the brain, the creation of new brain cells. There are very few things ever discovered that have the capacity to do that. And in addition to that, the coffee that I had today also had chaga in it, so chaga medical mushroom. And chaga's one of the most studied medicinal mushrooms in regard to its impact on cancer, in treating and reducing the risk of cancer. Just doing a Google search, going to Dr. Google, and looking at chaga and cancer, I think you're going to be really surprised at all of the published benefits that we see with medicinal mushrooms like chaga.

I get all of this together in the incredible coffee blend from Four Sigmatic. Go to Foursigmatic.com/model. That's F-O-U-R-S-I-G-M-A-T-I-C.com/Model. You get 10% off every single one of their coffee blends, their incredible dual extracted medical mushrooms, and their mushroom-infused hot cocoas, which is one of my youngest sons', Braden, it's one of his

favorite things. And so, they also have some other specials that I think you're going to really love, so pop over there, check them out. That's Foursigmatic.com/model for 10% off. And now let's get to the Apple Podcast review of the week.

**ITUNES REVIEW:** Another five-star review titled “worth your time” by big picture thinker 19. "Thank you for making complex information understandable. Every time I listen, I have something new and worthwhile to implement in my life that I know is going to make me healthier and happier. I am blessed to have a podcast like this at my disposal.”

**SHAWN STEVENSON:** That's what it's all about. Things that are hyper-complex, that are unnecessarily complex, really helping them approachable and attainable and usable by everyday folks. Because... This reminds me of the quote for Einstein that, "If you can't explain it simply, you don't know it well enough." We don't need all this unnecessary complexity. Human health is a right, and it's something that we should all have easily accessible in our lives, but it starts with our mind. Our body follows our mind and our ability to extract and assimilate this education. And so that's what this is all about and thank you so much for that acknowledgement. And if you had to do so, please pop over to Apple Podcast and leave a review for the Model Health Show. On that note, let's get to our special guest and topic of the day.

Tim Spector is a professor of epidemiology and Director of the twins UK registry at King's College, London. His work focuses on the microbiome and nutrition, and he's the co-founder of ZOE, a personalized nutrition company, which runs the world's largest nutrition study. He is also the lead researcher behind the world's biggest Citizen Science Health Project, the ZOE Health Study. Which provided essential data in response to the COVID-19 pandemic.

He was awarded an OBE, Officer of the British Empire, for his work. This is the British equivalent of a Presidential Medal of Freedom. Having published more than 900 articles and peer-review journals, he is ranked in the top 100 of the world's most cited scientists by Google. He's also the author of five best-selling books, including the Diet Myth, Spoon-fed, and Food for Life. Let's dive into this conversation with the amazing Tim Spector. All right, Tim Spector, it's so good to see you. Thank you so much for traveling all this way to come hang out with us.

**DR. TIM SPECTOR:** It's a pleasure and a privilege.

**SHAWN STEVENSON:** Awesome. I would love to start off by talking about how our transit time with our digestion correlates to health outcomes, specifically in the PREDICT study that you did, it's so fascinating.

**DR. TIM SPECTOR:** Yeah. So, the ZOE PREDICT study was a study which we did on over a thousand people, mostly twins, and it was to look at how people respond differently to identical foods and nutrition. So, it was looking at individual differences between people, and that was the whole basis of the personalized nutrition company, ZOE, which I co-founded. And basically, we studied these thousand people, really more than anyone else has ever studied people in the field of nutrition. By giving them all identical meals at identical times and then following them really in great detail for the next two weeks. And as part of that experiment, we gave them blue muffins, that were dyed bright blue, it was a fluorescent color, it looked unnatural. And we did this because it had a food dye in it that allowed you to track how quickly food was going from your mouth out into your poo in the toilet, and this is called transit time. 'Cause we got this really long intestine, nine meters long, no one's really studied this at all. We've had this other measure which we had for about 20 years called the Bristol Stool Chart, which was based on a couple of thousand people's studies. Which was just, "What does your poo look like? And is it like a rabbit dropping or is it like a cowpat?"

It was... That's rather basic. So, this is the first time anyone's done a really big study of this kind, and the results were really quite amazing, much better than we thought they were. Because the average transit time... And this was a group of... This was in the US and the UK; it was around 28 hours. So, 28 hours it takes for the average bit of food to go from your mouth out into the toilet. But there was a huge range from about 10 hours, to about a week.

**SHAWN STEVENSON:** Oh, my goodness.

**DR. TIM SPECTOR:** And many people were going less than twice a week, and so they had really long transit times. And it turned out there was a good collation between the transit time and the health of your gut in terms of gut microbes and the diversity of your gut health. So, it was a really nice way of... That anyone can do for free, to look at their individual health and get an idea of what their gut microbes look like without having to do any fancy testing. And it's... People have never really discussed with each other or how... "What's... Hey, buddy, well how's... What's your transit time like?" Well, you don't really discuss that. In the UK or the US, it's not a topic of conversation. It is in some countries interestingly.

I worked in France and Belgium as a doctor, and people are always discussing their poo with you, and it's quite common, comes up in the conversation a lot. But it's not in the US, a topic. And so, knowing what's normal and what's not normal, and so the closer you were to under 24 hours, perhaps that sweet spot between about 14 hours and maybe 20 hours, those people seem to have the healthiest gut microbes. So, something about getting that... Things moving, the whole place is not stagnant, is definitely healthy.

**SHAWN STEVENSON:** Yeah. Also fascinating is that you also had some connections between this transit time and being in a healthy range connected to lower risk of type two diabetes, better blood sugar management, and even less visceral fat. And it's so interesting how all these things are really intimately connected. Our gut, our microbiome, and these health outcomes. And so, at the far end of the spectrum, we're talking about somebody holding that in there for a week, which, this is not as uncommon as people might think. I remember when I was working as a nutritionist and also, I was still working in the gym from time to time, part-time.

And I had a client that came in, and she actually owned a restaurant by the way, and she was... I had a pretty good intake form at that point, I was about eight years into my experience. And she shared with me that she would only go number two every five, six days, and she was also very small. And I was just like, "Where is this food tucked away at?" And obviously, she knew that this wasn't a healthy thing. So, we got this end of the spectrum, but then if it's too fast, what can that be connected to, if it's like 10 hours or less?

**DR. TIM SPECTOR:** Yeah, well, then it indicates possibly you've got some gut problems, you might have irritable bowel syndrome, you might have some infections. And so, if you're too fast or you're going... And you're going like five or six times a day, then obviously that's when you know you need to perhaps seek help or work out you have a problem. So, there's clearly a sweet spot, but I think most people don't realize what actually is average and what is normal and what's healthy. And I think most Brits and Americans are quite happy going once every two days. They think that's quite normal because they know other people that that's what happens, but it turns out that's not healthy, that's not good.

And many people think, "Oh, to go more than once a day. That's not healthy." But actually, it is, and people who have good levels of fiber and plants in their diet, that's what generally they will do. They will be going more than once a day. So, I think... These sorts of studies are a great wake-up call to people to discuss things that we don't normally discuss and have an idea of how we're all rather individual, but where do we fit in, in this normal range. And we've all got very different lengths of intestines as well, so there's other factors.

**SHAWN STEVENSON:** Right.

**DR. TIM SPECTOR:** There's our body size, but then it's not always correlated to our intestinal size. And so, everyone's got to work out what really is normal for themselves, and I think that's just a common theme about running through all this nutrition stuff, is this idea of personalization. But... And also, what... Working out what normal is. What is a normal diet, what's a normal transit time, what does normal gut health look like?

**SHAWN STEVENSON:** Yeah, making this stuff, which is unfortunately so taboo, bringing this to light and just getting people educated in the lexicon about this stuff as well. And our mutual friend Will Bulsiewicz was here with us, he's helping to do the same thing. To make this stuff, taking it from taboo to a common part of our communication. Because everybody poops, but it's this kind of taboo subject, and our digestion and our poop, can also give us great education and feedback about what's happening with our bodies. In the book you actually share, of course within the gut we have trillions of bacteria, but we know that they play vital roles in our health. You say, in fact, and this is a direct quote from the book, "The individual gut microbes in the microbiome community, are best thought of as little chemical factories or pharmacies." Can you elaborate on that a little bit?

**DR. TIM SPECTOR:** Yeah, and I also changed my mind on... People are always asking me, "How do you describe the gut microbes, or the gut microbiome?" Which is the community of... And we used to be trying to work out what each bug was doing. How was it... They thought maybe it was eating something else or having some direct effects on us. But it turns out they're all producing chemicals. Thousands, hundreds of thousands of chemicals, and that's why we evolve with them. Because the human body can only reproduce a handful of gut hormones itself to break down food, etcetera, and it relies on having all these other organisms inside our intestine to do the vast majority of the work for us. And we've known that they produce vitamins, vitamin B, etcetera, we know they produce serotonin for brain health and neurotransmitters.

And there are the thousands of other chemicals they're all producing, and we now know that this is the key, because the better your pharmacy is equipped, the better your body's going to be adapted to aging and health, etcetera, etcetera. So, rather than thinking about each of these microbes as individuals trying to work out what they're eating or fighting or how they might be causing us infection, we've got to start thinking of them very differently and saying, "Okay, what are these chemical factories doing and how do we make sure those factories are well-supplied?"

Because the bigger the arsenal of chemicals we have got, the more we can help our immune system, because a lot of these chemicals are going directly just to the gut lining where most of the immune cells in our body are. Most people think our immune system is somewhere up in our neck or our bone marrow, but no, most of it's in our intestine, and it's there for a reason. Because it's absolutely crucial that it's aligned with our gut health and what we're eating. And the microbes are the intermediary between our food and our immune system. So, that balance... We're only just realizing this, how crucial it is, and it's our immune system that we now know is not just fighting infections, but it's fighting aging because it's mopping up a lot of the damage of aging cells, it's also picking off early cancers before they get going, and also this balance between overreaction and allergies with immune disease. Getting that balance

right, which as we know in the US is a major epidemic because we've lost... This power of our immune system's gone wrong and a lot of this is coming because of the poor health of our gut.

**SHAWN STEVENSON:** Wow. And also, you bring up this revelation that our immune system, and it just makes sense from an evolutionary perspective, what we're putting into our mouth, our immune system needs to be there, front and center. It's kind of working as like a security in a sense, to make sure and allowing in what is supposed to be in, if not, calling in the troops to take out things that could be potentially dangerous.

**DR. TIM SPECTOR:** Yeah, it's amazing when you think about it, all the different foods we eat, how does our body decide not to react against it. Like you ingest a poison or something or you get infected, your body reacts against it, but we have all these strange things we... And somehow, it's dampened down and says, "Don't worry guys, no need to over-react on this one, it's just a peanut," and for most people, that's fine, but when it goes wrong, it reacts against the peanut and causes allergy, but the vast majority of the foods are brilliantly handled by our body.

**SHAWN STEVENSON:** Yeah, and that's the thing too, is we think that the peanut is the villain, it's our immune system responding to the peanut, it's our bodies and its perception of threats in the way that it's kind of reacting or overreacting.

**DR. TIM SPECTOR:** Yeah, and peanut allergy was never a thing 50 years ago, so it just doesn't really exist. And then in countries that give their kids a lot of peanuts in childhood and when they're pregnant, don't really have these problems, a place like Israel, it's hardly a problem at all, and it's become a problem in the US and Western countries because I think of our gut health has got so much worse and that has affected our immune system, which means it's not working optimally, it's over-reacting, and that's an obvious example, and there's many other ones that we can't see as clearly that are affecting us and causing us ill health.

**SHAWN STEVENSON:** Yeah. And that's one of the crazy things. And we're often... Because we're just living our lives day-to-day, we don't think about the fact like where have all these allergies come from? The rates have skyrocketed. And also, the number of things we are allergic to as a species, we're not supposed to be allergic to the world or to the environment, and yet the biggest connection that we're seeing, and thanks to your work as well, is that a lot of this increase in our allergic response to things has to do with the derangement of our gut microbiome.

**DR. TIM SPECTOR:** Yeah, and in a way, our first instinct was to say, "Oh, someone's allergic, let's stop them eating everything, and let's sterilize everything and make sure there's nothing around that's going to trigger it and try and live in a Michael Jackson type bubble."

**SHAWN STEVENSON:** Right.

**DR. TIM SPECTOR:** And of course, that was completely the wrong thing to do, and it's taken ages for the science to show that like in peanut allergy, the worst thing you can do is to not expose kids to peanuts, you want to give them peanuts at an early age in order... So, their body gets used to it, in small amounts, I'm not saying you give them all huge bags of peanuts, but all the countries that have done that have said you... Even with parents who have an allergic problem, you need to do the opposite to what we've been taught. We've been taught, yeah, avoid everything, get rid of animals, never go in the countryside, keep away, sterile life, that's a recipe for disaster, and that's really what the last 50 years we've been doing wrong as a society.

We just had the wrong idea, rather than saying, "You need to get our body used to this stuff," we're saying, "Okay, modern medicine can just separate us from nature," and instead of embracing the fact that we've got these incredible immune systems that just need training, and if you don't give it stuff to train, it's not going to know what's hit it, and also we're hitting them with antibiotics, so we're knocking out our immune system. Every time a kid gets antibiotics... The average kid has at least one course of antibiotics a year now across the US, and most of it is unnecessary, and we know that some people react really badly to it and their microbes don't recover and others don't.

So, you combine that sterile living and the other big thing, junk food, it's not surprising we've got terrible gut health, terrible state of our microbes, which we now know is affecting our immune system, so we're just not dealing with things well because of this, and we haven't put those two things together really before. I think it's now obvious that this epidemic of allergies is related to our poor diets, our sterile living, antibiotics, all these things come together.

**SHAWN STEVENSON:** It's essentially... And this is again, so obvious, when we're not getting these exposures, it's making us less resilient, and so when we come in contact with said thing and our immune system doesn't have this training, it's going to make us more susceptible, this should be obvious. Now, with that said, if we're coming out of the gate and creating this hyper-sterile environment and we have a microbiome that's already incredibly deranged, it's essentially our immune system knows one form of martial arts, just knows kung fu. But we wanted to know Krav Maga, wanted to know Brazilian Jujitsu, we wanted to have this full range of... You said it earlier, the reason that I'm thinking in terms of violence, as you said arsenal earlier, but the ability to handle a lot of different things.

And also, so that we don't even know that it's happening, right? Wouldn't that be incredible? And that's the... We have the innate immune system, but we also have the adaptive immune

system, you talk about that in the book as well, getting these exposures and the ability of our immune system to learn and to be better whenever it's faced with a thing.

And to do so, we need that training, but as we've moved away from basic inputs, when you said kind of hiding out from things, I think of the same thing and it's the sun, for example, right? We just get all these messages that the sun is trying to murder you, it only goes down at night so it can plot more ways to kill you. And of course, yes, we do have a range of getting sunburnt and increasing your risk of skin cancer. And there's also thousands of other things we don't even understand yet, that the sun is having these positive beneficial effects on our health, and so if we just try to... We avoid the sun, we don't get enough of it, that's the culture we've become now, and we've gotten that one fear trigger and we immediately put all of our cards in, and so this brings me to what you talked about in the book as well, because it's not just the bacteria, we also have the virome, our collection of trillions of viruses and the microbiome. In particular you mentioned a sub-category, yeast, within this cascade of fungi we have and how yeast are actually... Certain strains are important for helping to reduce inflammation in the body and other health benefits, but yet when we hear the word yeast, we think it's a bad word when it comes to the human body, and inherently we try to kill all of it, which you say is a huge mistake.

**DR. TIM SPECTOR:** Yeah, there's still clinics everywhere offering to get rid of Candida from your body and eliminate it, and yet, yeah, at least 50% of us have detectable amounts of these yeasts in our intestines, probably more. And it's this tendency for humans to try and reduce everything to something black and white, good, the evil, and also this hubris about humans being in control of everything, that yeah, we have modern medical science, your MD can sort it all out for you, we've got powerful drugs, we can zap this guy, no problem, you'll be cured. That's the old-fashioned mentality of also curing everything with tablets and things, so yeah, you detect something, you get rid of that guy, and you're sorted. And we now know that we've been killing the wrong guys, we've been killing off our bacteria every time when you use antibiotics. All these studies killing off these yeasts have ended up disastrously.

**SHAWN STEVENSON:** Cue the ambulance...

**DR. TIM SPECTOR:** Yes.

**SHAWN STEVENSON:** Driving by.

**DR. TIM SPECTOR:** Coming, they're coming for us. And a great example is in the ZOE studies, we've now got over 50,000 poop samples, which we looked at great detail at the microbiome, and we discovered that about 1/4 of the UK population have this parasite called blastocysts, which if you look up any medical book will say, "Oh, it's associated with bloody diarrhea,

traveler's diarrhea. Take this anti-parasite drug, really nasty one to deworm you and get rid of it," and it turns out that it's associated with good health in all these populations.

And we have looked around the world now, and it's a sign of perfect health, and if you've got this parasite, you have less internal fat, you have less obesity, your blood pressure is lower, your lipids levels are better, blood sugar control slightly better, and this parasite is doing something really good in your body, and you really want to have this guy on your side, and only a small proportion of people do it.

In the US, it's only 4% or 5% of the population have it, probably being killed off by all these antibiotics and junk food and whatever, but if you've got it, you're much healthier than the people who don't have it. So I think we're totally changing our mind on who the good guys are, who the bad guys are through this modern science, and it's really a time to reevaluate everything really, our whole mindset about health, and a bit like the allergy question, killing the wrong guys, and I think we've just got the whole thing wrong, so we want to be like our ancestors who had all these parasites, they had all these microbes, they had double the number of microbes we have now, and through our modern medicine, as collateral damage, we've killed off all these guys and we need to start seriously think about reversing it if we're going to ever get healthy again as a population.

**SHAWN STEVENSON:** That's so fascinating when it comes to, again, yeast, and even you just said the P word, the dirty P word, parasites, and really re-evaluating our perspective on these things, because if we're talking about this blastocyst's parasite in particular, it's been around a long time, much longer than us potentially.

**DR. TIM SPECTOR:** 100% of our ancestors had it. So, we basically probably evolved with it, and we don't get it, we're not born with it, so we acquire it in the first few years of life, but obviously in our new sterile environment, we've stopped acquiring it, and that's spooky that very quickly in about 50 years, we're changing our bodies. Because if we think of our gut microbiome as a virtual organ like our liver or our heart, and it's only half the capacity it was 50 years ago, that's pretty frightening.

**SHAWN STEVENSON:** Yeah, yeah. And the key word here, symbiotic relationship, symbiotic. And you made a reference to this earlier, essentially killing off the good guys, and then at the end of the day, what are we left with? A bunch of villains potentially, you got this superhero team of villains or a super villain team, and wondering why our health is in such poor state. Now, this leads to something really interesting, you shared in the book how these particular microbes also communicate with our brain, they're sending out chemical signals, chemical messengers through our nervous system and basically informing us on what to feed them. Now, we might think we're just having a craving for something, but there's this symbiotic

relationship happening, and now there's this positive aspect to it, but then what if you have dysbiosis and you have a lot of pathogenic bacteria running your system, and you think you've got a craving for some Ding Dongs or some Ho Hos or whatever. Do they have this stuff in the UK? No Ding Dongs?

**DR. TIM SPECTOR:** Was that Twinkies or...

**SHAWN STEVENSON:** Ding Dongs are like little cupcakes; they look like hockey pucks. Alright, Ho Hos are like circular, never mind. And I think it's an insult actually, the processed food companies like Ding Dong, Ho Ho, you're still going to eat it, but the UK has some strange name stuff too, bangers and mash, you know?

**DR. TIM SPECTOR:** Well, bangers and mash sounds healthier than Ding Dongs, but either.

**SHAWN STEVENSON:** It definitely does. And it is, it's been around a much longer time than a Ho Ho.

**DR. TIM SPECTOR:** We have donuts, and we have all kinds of rubbish as well.

**SHAWN STEVENSON:** Oh, we got a rubbish drop on here, this is awesome. So, with that being said, this information coming from our gut informing us on what foods to eat to feed them, let's talk a little bit about that.

**DR. TIM SPECTOR:** Yeah, so if you think each of your microbes has its own evolution, and we've evolved, but it takes multiple generations for us to change our genes and evolve, whereas some of our gut microbes can reproduce every 30 minutes, okay? So, they're living hard and fast and furious, these guys right there, having sex and having babies and it's all happening inside an hour, and so their genes are changing, and if you get an overgrowth of say, particular bugs that are... They like living in an inflammatory environment, so they like burgers and fries and things that will generate lots of fats and things that will generate a little bit of inflammation, which is the stress molecules you'll get in your gut, then they will evolve to send out chemical signals to get more of it if they can.

And that's what we know happens in some animal models, that by growing certain microbes, they'll send off chemicals to say, "Send me more of that food," and they've done all kinds of really fancy experiments to change the way insect behavior works so that rather than picking sugars, they will go for protein or vice versa, just by switching around their microbes, so...

**SHAWN STEVENSON:** Interesting.

**DR. TIM SPECTOR:** They've proven that your microbes can certainly determine your choice of food, how much sweet, how much protein, and we think the same happens to some extent in humans, haven't been able to prove it, but it makes absolute sense, and it probably is why people get into this junk food cycle, where the only microbes that are still living, 'cause these are just living off a bit of fat that's down there and other chemicals that they are living off in a very inflamed environment, their natural evolution, if they've been there for years also, they've probably evolved chemicals to say, "Give me more of this food," because of the symbiotic relationship with the host, 'cause they're just sitting there waiting for you to eat another burger, and they might well send signals saying, "Well, I don't want any of that salad. I don't want that gherkin, just give me more of the... I want some more of that bread and more of that burger."

So that's what we think happens, we haven't proven it, but it's certainly... In the insect world where you can do these experiments by swapping foods around, it's very clear it works, and it makes sense because the microbe like us is evolving, but they're just doing it so much faster.

And so, I think it's one of the reasons that it is hard for people to break these habits and to go from very unhealthy diets to healthy diets. Sometimes if you've got the wrong set of microbes, they're not going to be happy for the first few weeks, and it's also why people with some gut problems do you find it hard to suddenly shift to a high fiber diet early on, they're geared up for it, so they have to be... They often get put off 'cause they feel unwell when they first start, so I think it's all part of this idea that having lost all the healthy microbes, you don't have those guys there breaking down the foods as you'd like them as well.

**SHAWN STEVENSON:** Oh, man, it's so fascinating. And to think that some microbes like an inflamed environment, they thrive there, they like a little hell in the belly.

**DR. TIM SPECTOR:** Well, like humans as well, there's people who like criminal activity and life on the streets and the adrenaline, and there's lads who like the quiet life and others, so we all evolve to fit an environment. If there is a different environment, how are you going to survive in that environment? You have to adapt, and this is what these guys are doing, so our job as the host is to give these guys a really good, cool environment to live in that is healthy, that would allow the good guys to grow and then they produce the healthy chemicals that are really great for our immune systems so we can flourish.

And we best got to realize that we have this power, and the food choices we make every day are the most important ones we can make for our health, and by understanding why and introducing this whole concept of these gut microbes, I think it makes it easier and makes it more relevant to really understand what you're doing every time you put food in your mouth.

It's not just a tube, it's just not just flushing out the system and not just providing calories, it's much more important. Much more subtle than that.

**SHAWN STEVENSON:** Yeah, and I think keeping in mind too... By reading your book, this is one of the things that jumped out. We have these where there's such diversity, potential, of course, that diversity has been going down in our modern culture, but understanding there are going to be some microbes that all of us have that might want to do a little B&E breaking and entering, some crime, like you just said, it's kind of a representation, our inner world is a reflection of our outer world in a sense, and it's really about creating conditions where health and good relationship, good community is thriving overall, and so it can keep other stuff in check. And with that said, it's not just our microbes, obviously that are having influence on our taste preferences, one of my favorite parts of the book is when you dig in on how we taste, how we experience taste and flavor, which there's a little bit of a difference between those two things in and of themselves, but can you a little bit about that because it's so fascinating because I remember us being in elementary school and talking about our taste buds and just how distorted our view is previously into where we are with Science today and understanding how we taste.

**DR. TIM SPECTOR:** Yeah, well, so it was only when I got really deep into this that I started to understand, 'cause I'd been taught at medical school that we all had these little areas of our tongue that were for the different taste areas, and the bitter and the sweet and the sour, it turns out that's all rubbish, it was just invented by some German professor and he made up the results. So that's the first thing to rise, it's actually much more sophisticated than that, and the human can detect incredible numbers of combinations of different tastes, we're really good at it. But without our nose, we're pretty useless if we just have our tongue itself. So we do most of our tasting through our nose and the passages of the back of the nose, the retro-nasal passages, and virtually everything we do with taste and food is determined by that area there, and so anyone can do an experiment by putting a clip on their nose and blindfolding yourself and putting different bits of food on your tongue, and I did this and really can hardly tell what you're eating at all, and it's really impressive when you can't tell the difference between an onion, a lemon, a watermelon, bit of salami. It really makes you understand the importance of smell in our system, which we've forgotten, and that's clearly evolved to a very fine point.

So, we always think of dogs, etcetera, as being the best sniffers in the world. We're pretty good compared to most animals, and that means we're very careful of what we put in our mouths. And so huge evolution has gone into this whole way of tasting, but at the same time, we do know that there are these super tasters and there are people who can really find better tastes pick them up much reasonably and they find it harder. So, explains why some people find it much harder to drink coffee than others, or eat kale or Brussels sprouts because they are

tasting differently to perhaps you or I, and there is this much bigger range in how we're perceiving things.

It's like you can't judge how that tastes to you. We use a bit of language description, well, that was kind of sweet, kind of nice, kind of tangy, but you've got no clue how each of us is responding to this stuff, so realized how individual it is, but how finely tuned our evolution is, and it was really, really fascinating science to uncover all that. There is actually a much bigger range of tasting, and that's why it is harder to get some people to get salads than others, and some people don't eat chillies very easily. They find that really difficult. Now, there's much do have a sweeter tooth, and so we all start at a different point, but what's also clear is that if you expose people early on to these healthy foods, they will adapt, may start at a different point, but nearly everyone can adapt and... I talk quite... I'm big fan of kimchi, the Korean spicy cabbage, and most Americans wouldn't immediately say, "Oh yes, kimchi for breakfast, that's great."

And there's a huge variety about whether they like all that spiciness or the chili or whatever, but every Korean kid gets given kimchi as soon as they're weaning, and they spit it out a couple of times. It's a big thing in Korea, they show these photos, the little babies spitting out their first kimchi, but they keep giving it and, in the end, they all love it. So, I think although we've got this big diversity, we can train everyone to eat in a healthy way. We don't have to immediately say, "Oh, let's just give them baby food," and this rubbish and shouldn't have children's menus. They should start to learn early age; you know what good food tastes like.

**SHAWN STEVENSON:** The kimchi rite of passage.

**DR. TIM SPECTOR:** Yeah, well, perhaps we should all start doing the same thing, 'cause they've got something right. They're about the only rapidly developed country that has stayed healthy and is not obese, and because they have kept this food culture going and this amazing culture of having kimchi at virtually all their meals, which is a probiotic, and talk about it 'cause it's prebiotic and probiotic, it's full of microbes, and it also preserves their food culture, so really important at all levels and gets kids very early on to be able to taste better and sour and spicy food that steers them away from that sort of sweet gooey dairy flavors that we've gone for in the west, just keeping kids on breast milk for life, essentially.

**SHAWN STEVENSON:** Yeah, there is something remarkable that happens with that fermentation process. I actually noted a study in my last book, "Eat Smarter," they had test subjects to consume either the kimchi, the fermented version or the ingredients that hadn't been fermented, the cabbage and the radish, the carrot, whatever the case might be. And it was so fascinating that there was a significant improvement in metabolic health when they were given the fermented version. There's something about those microbes and the

interaction with our cells, our human cells that it really points to the fact that this is something that we need. And when I used to work at the university gym, I would ask people... That was after a couple of years, but because I'm working at a university, I'm working with people from all over the world. And eventually, I started asking people like, what kind of fermented food do you have in your culture, and every culture had cultured food, every single one, and even the word culture is there, and I thought that was so fascinating and...

**DR. TIM SPECTOR:** What do the Americans have?

**SHAWN STEVENSON:** Pizza rolls. So yeah, that's the thing. And if we can start to borrow because we're all... America is known as this melting pot, start to borrow from traditions that have interacted and/or our relatives, our close ancestors, as one of the ways I found much more success with helping people to get well. It wasn't having to do what I think they should do, but... What's your lineage? If you're from this particular region in Kenya, Nairobi and your ancestors were eating goat, niyama and chapati, or if you're from Ethiopia, you have this fermented bread, right? Maybe let's add some of that in, and they're like, you know what, I really love my grandmother... Let's add some of that in a little bit less pizza rolls.

**DR. TIM SPECTOR:** Yeah. An idea the Second World War changed a lot of things. And before the Second World War, sauerkraut was really quiet a big thing in the US, and because it was associated with being German, it was like banned, like the Freedom Fries saga.

**SHAWN STEVENSON:** Typical Americans.

**DR. TIM SPECTOR:** Yeah. They just said okay...

**SHAWN STEVENSON:** Just so we can kick it all out the window.

**DR. TIM SPECTOR:** Yes. We're not having that Nazi stuff. We've got to ban it, and it's not American to eat it anymore, and sadly, that's a bit of the legacy because it was pretty big apparently in '30s and '40s, people were making themselves. It was a thing everyone could make in their house, and embracing these other ferments as other countries have done really important, and I think the science is now showing us that this isn't just folklore that these were healthy.

They have been really good experiments. Very recently, there was one done in Stanford by colleagues of mine, and just in six to eight weeks, people have are going three to four portions of fermented foods a day, dramatically reduced their inflammation levels in their body and really had a big impact on their immune system, and this has been one of the first really detailed studies that has done this properly, which matches the big population studies, but I

think it is really important that people understand how important this is on top of a healthy plant-based diet to have some of these foods regularly is really vital, and most of human history, we've done this, and people don't realize how much fermented food we used to have before we invented the refrigerator.

It was the way to preserve food and keep it going and get these regular supply of microbes into us that I think probably we evolved to eat and probably why beer was invented at the same time as bread, because we're using these yeasts and using their products, and they have this really powerful effect on immune system, so I'm a big fan of fermenting and I think everyone should learn how to do something about it.

**SHAWN STEVENSON:** We've got a quick break coming up, we'll be right back. I've got some very bad news for you about vitamin C supplements, most people have no idea that typical vitamin C supplements are made from corn syrup or corn starch derived from GMO crops. The synthetic ascorbic acid found in most vitamin C supplements is structurally similar to naturally derived whole food sources of vitamin C, but they are not the same thing. Whole food and whole food concentrates of vitamin C have hundreds of other bio-active co-factors that make vitamin C work miraculously in our bodies. While synthetic vitamin C is the very definition of a one-trick pony, in fact by being devoid of essential cofactors, synthetic vitamin C supplements can be outright harmful to your help. For instance, a 2013 study published in the Journal of the American Medical Association, Internal Medicine, found that participants taking synthetic vitamin C supplements had twice the risk of developing kidney stones. Another study where researchers at USC found that a daily dose of synthetic vitamin C thickened the walls of participants' arteries two and a half times faster than those not taking the synthetic supplement.

This is absolutely insane because number one, it's one of the most popular standalone supplements in the world and commonly found in most multi-vitamins. Number two, whole food-based whole food concentrates of real vitamin C are remarkably effective in lowering the risk of cardiovascular disease even in people engaged in high-risk behaviors like smoking, a randomized placebo-controlled study published in the Journal of Cardiology had 20 smokers consume a whole food concentrate of vitamin C in the form of camu camu berry daily over the course of one week study, and it led to significantly lowered oxidative stress and lowered inflammatory biomarkers. What's more, there were no changes in these markers and the placebo group received an ordinary synthetic vitamin C supplement. Because the damage humans have done to the soil microbiome levels of vitamin C are notably lower in typical foods. That's why I have been utilizing a whole food vitamin C concentrate blend of camu camu berry, acerola cherry, and amla berry for years, and I'm on a mission to spread awareness about this and get people off synthetic vitamin C supplements.

The essential C complex from Paleo Valley is all organic, no synthetic ingredients and no fillers, plus it has a 60-day 100% money back guarantee. So, if you aren't absolutely thrilled with it, you'll receive a full refund, no questions asked. Go to paleovalley.com/model right now, and you will automatically receive 15% off of your order at checkout. Vitamin C is critical for our immune system health, but also the health of our heart, our brain, our skin and so much more. Target organic whole food sources of vitamin C and if you're going to supplement, make sure it's a whole food concentrate and not synthetic vitamin C. Go to paleovalley.com/model, that's P-A-L-E-O-V-A-L-L-E-Y.com/model, right now for 15% off, and now, back to the show.

**SHAWN STEVENSON:** You specifically mentioned how the environment can shift taste as well, and you feeling like you have a certain sensory intelligence for tasting beers under certain condition, right? And this leans back into understanding a little bit more how our sense of smell is involved in that interaction, and so much so that you share this really fascinating study on... If you think about this logically, if our sense of smell is so tied to our survival and how evolved is just so that we're selecting healthy foods, and that capacity to smell diminishes once we hit a certain age bracket, you mentioned 75 years old, essentially, there's some time downturn, but you shared this study, and this was a 2014 study, and this is directly from your book. It looked at 3000 Americans aged 57 to 85 and tested them with five classic smells, rose, leather, fish, orange, and peppermint, and followed them for five years. Those test subjects who had problem smelling had a four-fold risk of death from all causes. That is crazy, crazy.

Now, this can evoke some fear here because just like, I don't want to lose my sense of smell, but you also shared in the book that we have the capacity to essentially exercise our smell, exercise are taste buds by exposing ourselves intentionally to multiple odors and increasing the number of nasal nerve fibers. That's so cool.

**DR. TIM SPECTOR:** Yeah, it's a bit like going to a gym and working out, get extra muscles, doing the same for smell and using that bit of the brain and expanding it is really important in the same way people try to do crossword puzzles to stop dementia. I think the smell is also an important part of our life, and that means having a big variety of foods, and again, coming back to this recurrent theme of diversity of foods rather than this narrow range of beige stuff, which is easy to eat, let's challenge our palates and nose more. And it's interesting, since I wrote the book, I remember my mother, who is late 80s, suddenly lost her sense of smell, and she went through various tests, they couldn't find anything wrong with it, and two years later, she had a mild stroke and got dementia, and it was really... An anecdote like that is quite striking that shows how important smell is as a first sign of perhaps damage to our brain and how crucial it is to us as humans and sort of neglected that bit of our bodies, so yeah, perhaps we should start some smell gyms as part of this to get us back to where our ancestors were, 'cause I'm sure you go back to some of these ancestral tribes, they are a lot better at this than

we are. We just go to the store and buy stuff and assume it's fine, whereas we'd be sniffing it and looking at it in much more detail I think if we didn't have civilization.

**SHAWN STEVENSON:** Yeah, Ding Dongs don't change in their smell, and the thing is, you truly... You know quite a bit about this subject because utilizing the data that you collected through ZOE, you were actually able to really help to pinpoint the fact that one of the early symptoms that we could find as far as COVID-19 was a loss of smell and your data actually helped to get the word out about this. Can you talk a little bit about that and also, if you can talk about how the process of losing our smell can disrupt our taste of things and also potentially lead to depression.

**DR. TIM SPECTOR:** Yeah, sure. So we started the company ZOE about six years ago, and we just launched our first personalized nutrition product when COVID broke out and all our studies had to stop, it was very difficult to carry on working, so in London, at the time the engineering team was stuck for things to do, and cycling home one day, I came up with the idea of repurposing the nutrition app for COVID and seeing if we could get a real-time idea of how much COVID was out there and what's going on when there was... If you remember, there was no testing, there was no, it was chaos in sort of March 2020, you couldn't see a doctor, fear everywhere.

And we launched this in five days. The team at ZOE were incredible and had no idea whether anyone would download or not. But in 24 hours, we had a million downloads. And within two weeks, two and a half million, it was phenomenal. All our servers broke and everything. You can imagine the chaos. And people loved it because they had a chance to actually, interact with each other and perform a citizen scientist. And it ended up being the world's biggest citizen science project on health. And it was a fantastic success. And people reporting whether they were getting tested or not, what their symptoms were every day, what was happening in their local area. And we started expanding the list of symptoms and very quickly saw that as on top of, it was fever and cough, if you remember. And shortness of breath were the only things were talked about from the original Chinese variant.

Suddenly, you know, a third of people reporting loss of smell. And those people all had the positive tests in our subgroup working in hospitals, et cetera. So, we went out there and said, this is a real symptom. And it went around the world. And because we had such a big database, the WHO believed us and changed their criteria. The US did the same and it had a major impact. And so suddenly people who weren't... Who maybe didn't have a fever, just had loss of smell, which were some people who were otherwise infecting people and going to work, et cetera, suddenly said, okay, you know, I'm going to stay at home. I'm infectious.

And so that was really, really proud of that bit of citizen science was, it happened so fast as well. And we were months before the government had actually sort of geared up to do anything. And the other thing we showed was, what the impact of this loss of smell was. You know, people hadn't experienced this before and a lot of them were really worried what was going on in there and they lost the will to eat. Many people got totally anorectic, lost all interest in food, and became very depressed. So that was a really marked thing, how you realize how important taste is and smell is for humans. And many people had this, they went on for months and they were the most badly affected Psychologically many people lost their jobs in restaurants, et cetera.

Those who couldn't taste, who had a... Someone who was in the wine business, was just useless, couldn't function. And long term they've worked out that people who had long COVID, this is one of the sorts of worst prognostic signs. 'Cause it often meant that there was quite major brain damage because the virus had actually entered into the brain and was actually knocking off the cells that were responsible for the smell at the base of the brain. And, yeah, it was a big wake up call. And it just emphasized how important food and taste is to our overall health and the enjoyment of food as well. How crucial that is. And that to me was the sort of number one factor that food isn't fuel. It's so much more than that and it's so much more what defines us as humans.

**SHAWN STEVENSON:** Yeah. Yeah. And this is another one of those kinds of catchy things to say is to eat to live, don't live to eat. Right? And I understand the principle, eating for a purpose to fuel your body, all these things. But the reason that we are driven to eat foods is because of the experience. We are hardwired to enjoy flavors and to enjoy the experience of eating. And you spend time with the Hadza for example and seeing what they're driven towards naturally without any kind of marketing machine behind it, trying to tell them what to eat. You know, there's a certain flavor profile, in particular, honey, for example, which in our culture we might think, shouldn't eat a lot of sugar. Their rates of... I mean, to even say rates of diabetes or heart disease is kind of, it's almost nonexistent, essentially.

And for me, I think, and I'm wanting to shift this around as well, to be intentional of course about our food selection, but also understand that if you really want to help people, we have to understand and leverage the fact that we love food. And that's a good thing. That's okay. Let's heighten the intelligence of this system, support the system, because right now it's being manipulated on so many different ends of the spectrum. And so, I want to ask you about this. You mentioned earlier a little bit about how ultra-processed food consumption is disrupting our microbiome. According to the BMJ, about 60% of American adults diet is now made of ultra-processed foods. For children it's worse, you know, it's almost 70%. And that's according to JAMA, just published some data on that. Now, we've got the microbiome impact. But one of

the things I don't think we think about is the fact that even when you're talking about the immune system earlier, it's not only what we're feeding our microbiome, but it's what we're making our tissues out of.

And even our immune cells are being made of the stuff that we're eating. We really don't even understand the ramification of what happens when you go from eating a real food, something that's close to its natural state to eating something that is so distant from anything real or natural. And your body's trying to use that to build tissues, to build your immune cells, to even create the communication between these things. And so, the question I want to ask you, with all of this disruption taking place and the popular narrative is telling people that if you want to get healthy, you just need to manage your calories, right? It's a calorie game. It's an energy expenditure versus what you're taking in. What's the truth here when it comes to our association with food and calories? Is monitoring, micromanaging our calories, going to help us to lose weight efficiently? Or does the food quality matter a lot?

**DR. TIM SPECTOR:** Well, you sort of know the answer, don't you? But numerous studies have shown that diets based on reducing calories alone, certainly don't long-term help weight loss for the majority of people, they bounce right back. And that's 'cause our bodies are adapted to counter major reductions in calories by reducing metabolism, by reducing our exercise outputs and having other compensatory mechanisms to make us hungrier. Okay.

So, we just eat more and number of recent studies about ultra-processed foods showing that compared to real foods when you eat them, it makes you hungrier even with identical calories. So just having this fake food that's just, they're repurposed extracts of other foods, stuck them together to make them look like food. They're designed to make you overeat by 10 to 20% more every day. So that's been shown scientifically in proper studies run in an unbiased way.

So, if you rely totally on calories, and you ignore the quality and you telling people, it doesn't matter what you eat, eat the cheap stuff that has a shelf life of three months, and you can microwave. It's the same. That's a total fallacy. And it's one that the food companies have wanted us to believe because they can put on their packets low in calories, low in fat, high in vitamins, and people think this is actually good for you and it is really bad for you 'cause it has no good nutrients and will make you overeat. So, the quality of the food is really important and those foods are also bad for your gut microbes. So identical calories, very different profile on your body. They get absorbed much quicker. They don't trigger the fullness hormones in your body.

So, you carry on eating, they go straight into your bloodstream, give you sugar spikes and, and fat spikes much faster. And there's little fiber so they don't nourish your gut microbes, you're not getting extra species and they've got these extra chemicals in them because they're fake

food. They've got to add all these extra chemicals to give it it's texture. So, they have glues in there, emulsifiers, gums and they can stick your microbes together they're not used to this stuff. 'Cause they never, in their millions of years of evolution have never encountered it. They don't know what to do when they encounter an artificial sweetener, which generally derived from paraffin and the petrol industry. So, none of our ancestors were eating this stuff. And so, our microbes, they try and break it down and they produce all kinds of weird substances instead as a byproduct, which caused havoc with our normal communication system with immune cells.

**SHAWN STEVENSON:** Endotoxemia.

**DR. TIM SPECTOR:** All kinds of stuff can happen. We know very little other than there's a major disruption to our gut microbes when we have these artificial substances in our gut, which we were told were inert. It just zero calories passes straight through you, no problem. It's a win-win. Well, it's not, and we know also that people having artificial sweeteners, if they swap say regular sodas for diet sodas on average, no one loses weight. So, the body compensates something else is going on. It's kind of bad. So, the whole story about the calorie is there to just mislead us and camouflage the poor quality of the food that's been passed off to the average American. And I think that's really important that we get back to this concept of real food, real quality, and people understand the reasons behind it.

And I think it isn't just a question of the old stories of calories and fats and sugars and salts, that's a little bit of the problem. But that's an easy one for the food companies to get around. They just reformulate it. But it's the quality, it's the fact that it's not real food. That's the major problem. And that's ultra-processed food is taking over the western world and we can see the effects and it's going to bankrupt us all. I mean, it's totally unsustainable and yet no one wants to do anything about it.

**SHAWN STEVENSON:** In particular with your data on twins, identical twins and being able to see how calories can impact different individuals, but we're talking about identically as far as their genes, genetically identical to individuals who would think that eating the same foods being in the same environment, they're going to have the same health outcomes. But you saw a variety of different health outcomes with physical and mental health. So, can you talk a little bit about that aspect and how the microbiome even is another kind of epicaloric controller determining what calories do in in the body?

**DR. TIM SPECTOR:** Yeah, so I've been studying twins for 30 years and I was always looking for reasons why identical twins often got different diseases, why one died earlier than the other. And you know, they didn't both get the same cancers, didn't both get depression or autoimmune disease. It's always a bit of a mystery to me, why these genetic clones lived

together. They should... Everything should happen the same. And it was only when I started studying the gut microbiome, that I realized that was the first thing I'd ever seen in like 25 years that was different between identical twins. Their microbes, when you looked at them, they only shared about 25% of their species. It's quite remarkable. And so, for me that was a big aha moment to say how important the gut microbiome is. And that's really what led to this whole idea that we are all very individual in our gut microbes. So therefore, we must have very different responses to food. We didn't know that for sure until we did the ZOE PREDICT study where, we took a thousand of these, mostly twins and gave them all identical foods at the same time of day and monitored how they responded. And it turns out there was 10-to-20-fold difference in blood response in sugar, insulin and fat levels to identical meal. And...

**SHAWN STEVENSON:** With identical twins.

**DR. TIM SPECTOR:** Yeah, well, on average, the average population was still over 10-fold. But even in identical twins there were still big differences. And so, you'd have one twin that would respond well to fats and the other one would respond poorly and vice versa with sugar. And a lot of this difference was explained by the differences in the microbiome. And so suddenly, this idea that one size fits all was blown out of the water. And the idea that also... I was biased, I was a geneticist that I could explain this with genes, that's why I put twins in the study. I said, "Oh, I'm sure genes will be a big explanation for this." Only a very small explanation and not even worth measuring the genes to try and predict outcomes. So, we suddenly had this really new concept of, our individual differences to foods being driven by things that weren't our genes and were things like our gut microbiome that you could influence.

It was also things like sleep and exercise and other factors. So, it's not saying it's only the microbiome, but just the fact that that really changed the paradigm. And also, I think just the huge differences. If you and I tested eating the same muffin or donut, we have a very different response and that determines then how do you then pick what's the best food for you to eat? It's going to be different for everybody. That really was the basis then of going on from those studies to have our commercial product, the ZOE, personalized nutrition program. Because if you didn't have those differences, you'd have nothing to play with. But we were able to predict with machine learning models, you know, based on those tests, how you then respond to any meal and give you a score for all your foods. And I go into the book about, my own scores and how my sort of journey as I change my ideas about what good for me and what wasn't suddenly, having some tools to do that with rather than just my gut feeling, which unfortunately turned out to be not very correct.

**SHAWN STEVENSON:** That's such a poetic thing to say, the gut feeling on top of all this, and this is really pointing to something, again, very logical, but we've been doing much the opposite, which is this should be based on you as an individual. There's no two human beings

that are truly identical in particular, if we're talking about this microbial cascade that we all carry and the genes of these bacteria, for example, far outnumber ours in some aspects. And also, you mentioned that replication process can happen so quickly and the shifting, the ebb and flow of what's going on there and it's just such a bigger picture. But yet we like to think that we've got it all figured out and that's part of the problem.

**DR. TIM SPECTOR:** Yeah, well, we're so dumb. We think it's easy and we think we've... Our problem is we've underestimated food. We said, "Oh, it's easy food, it's about calories, it's about saturated fat, it's about the sugars." That's all you need to do, or sort this out. All you got to do is cut out lectins, cut out gluten, do this, reductionism like we're so clever. It's all about this vitamin, just take vitamin D, you'll be fine. Vitamin C injections all sorted. It's nonsense. We humans are incredibly complicated. Food has over 30,000 chemicals in it. Our gut microbes convert that food into hundreds of thousands of different molecules we still know very little about. And all of us produce different ones and they go into our blood in different ways. So, we're much more complex machines than we've given ourselves credit for. And the idea, we can divide our food into three sort of sections and that's it.

Are you high fat, high carb, it's just rubbish. We've got to start thinking much more holistically. And realize that, yes, we need to, even with the ZOE program, where we look at fats and sugars and microbiome, they're just the things we can measure at the moment it's pretty good, but might be other stuff in 10, 20 years' time there's some other technology that shows us there's other bits in that picture as well, but at least we're moving in that right direction towards understand this human complexity that is... Yeah, it's sort of fun 'cause it also, I think, always keeps coming back to the same thing that the best bet is to eat a diverse diet. It's to have as many different plants as you can. It's to have these fermented foods with all kinds of different bugs in them, these probiotics. It's to sort of throw everything at you, increase your sense of smell and taste and try everything. It's that variety, variety is the spice of life and I think that's what we keep coming back to is that as the way to deal with our complexity.

**SHAWN STEVENSON:** Let's go to the smell gym and make that...

**DR. TIM SPECTOR:** Let's work out. Yeah.

**SHAWN STEVENSON:** Let's work it out. So, this has been incredibly fascinating and just to unpack this and if you could, because I think folks are going to feel motivated to focus on improving the health of their microbiome. What are three things that people can do in their own lives to support a healthy microbiome?

**DR. TIM SPECTOR:** Well, the top three things you can do, the first is to have a diverse series of plants on your plate every week. And we did some studies a while back with the British and

American gut project that showed 30 plants a week is the sweet spot. It's not as tough as you think 'cause that includes nuts and seeds and herbs and spice mixes and it's quite achievable if you just have a few hacks like I have a jar of nuts and seeds mixed. It gives me about eight to 10 plants in a go. So, you can get around it.

Second thing is to try and eat brightly colored plants. We haven't discussed this much, but the polyphenols in the plants, these sort of phytochemicals that defense chemicals that all plants have to some extent, but some have lots of them and they tend to be really brightly colored ones and they're ones that are also bitter and those defense chemicals end up being really good for our gut microbes like rocket feel for your gut microbes.

So that's why coffee's good for you. It's not the caffeine, it's the polyphenols in them and that's why dark chocolate is good for you. That's why nuts are good for you and it's why olive oil is so good for you. But also berries and other plants like that. Then fermented foods we discussed having small amounts, regular and often to boost your immune system, really important and boost your gut health. And we've... I think we evolved to eat them, and we've just forgotten how to do that and try and eat as many different ones you can. Don't just have the same yogurt every day. Mix it up, get some of these other, I call them the four Ks, the Kefir, Kombucha, Kraut and Kimchi. Just think of different ones you can have in small amounts. They're the top three. And I'd add in two more.

One is we haven't really discussed it but giving your gut a rest. So, time restricted eating is actually beneficial for your gut microbes. So, if you can ideally leave 14 hours when they're not working, they really respond well metabolically. And so, we've done some big studies of this, looking at over a hundred thousand people and generally people eating in a 10-hour window and then 14 hours, not eating, most people do pretty well on that and that helps their metabolism. And finally, cut out as much as possible ultra-processed food.

**SHAWN STEVENSON:** It's pretty simple. You abbreviated ultra-processed food in the book UPF, and I flipped it around and put foods ultra-process and that made it F effed up or F up foods and it really is pretty that it's pretty simple, making that shift. And what I really love about your work too is that it's not an all or nothing thing and you're promoting a lot of variety and not saying that ultra-processed foods are not going to be something that we might be exposed to, but just shifting that ratio, like you just mentioned, targeting 30 different plant foods a week, you can get 10 in a meal pretty easily, especially if we're talking about spices, cayenne pepper, cinnamon, all these different things, oregano, basil, and you've got these wonderful sections at the end of the book and kind of giving a masterclass on different food categories, right? And answering a lot of questions, dispelling a lot of myths. It's a wonderful book, Food for Life. Can you let everybody know where to pick up a copy of the book and also where they can get more information about ZOE?

**DR. TIM SPECTOR:** Sure. So, online retailers have Food for Life, so usual ones like Amazon, the place to go for that. And it is in Kindle and Audible form as well. And for, ZOE, go to joinzoe.com and people can sign up and get their program test their gut microbes, test their sugar responses along with all the other tens of thousands of people who already done it and see how they get on. And you may be able to give a discount if you give them the right code.

**SHAWN STEVENSON:** All right, we'll put that in for the show notes for everybody a special, which this is news to me. Thank you so much. We'll put a note for discount for everybody to join ZOE. And you guys have so many incredible things going on with ZOE to be citizen scientists because truly our life experience and one of the things I really picked up from your book is we are all so unique, but we tend to see things in this kind of systemic view.

And in reality, for example, no two people have ever tasted the same thing and had the same experience, right? We think everybody else tastes like we taste and that's just not true at all. And of course, there's a nature versus nurture here. Our conditions can... We can change how we're tasting things, but innately we have a certain taste or taste preference and to be able to have a more literate taste, experience, right?

So, creating more taste literacy is one of the hallmarks of health. And also understanding that a certain food that might be wonderful for you might not work for the next person. And that's okay because I think a lot of people are frustrated when they see a friend who might be thriving with a certain diet framework and they're doing the exact same thing and they're not getting the same results and just understanding more of our uniqueness, getting these tools, that's what your work is about and I truly appreciate it as we shared before we even got started today. I've been admiring your work for many years and so to have you here to share your brilliance is really special. So, I appreciate you so much.

**DR. TIM SPECTOR:** It's been a pleasure.

**SHAWN STEVENSON:** Awesome. Tim Spector, everybody. We are so much more than human. We are so much more than what we see in the mirror. We are a compilation, we are a community of organisms, and of human cells, of course, that are working together for our collective good. Now, the question is how quickly are we going to respect and accept this really important symbiotic relationship and start to take care of our microbes? We've been at war essentially with bacteria since we had a strong enough microscope to see little things wiggling and jiggling around. We went to war with them. The scientists were like, we found it. We've discovered the thing that's causing all this sickness. Let's kill them all. And so, they started creating effectively little miniature bombs to go off within our gut in the form of antibiotics

to destroy Friend or Foe. It didn't matter what jersey the microbe was wearing; it's taken out everything.

And today of course, we've moved on to be a little bit more intelligent with the use of antibiotics, with selective strains that we can target. But overall, we've been ravenously using antibiotics. And oftentimes, and there's plenty of peer-reviewed data on this, using antibiotics in places that are inappropriate where it's not even a bacterial infection, it's a viral infection for example, or a fungal infection. But we've just made it a part of standard of care in going for these antibiotics. And now we're seeing the ramifications with antibiotic resistant strains of bacteria that are deadly. And so maybe we went too far, maybe we went too far in our war against microbes, in our war against bacteria. And we need to create a healthier, again, cultivating this symbiotic relationship with acceptance, with admiration, with respect and understanding that we are more than just human.

And I hope that you really enjoyed this episode. If you did, please share this out with your friends and family. And of course, you could take a screenshot of the episode and tag me @shawnmodel on Instagram and Twitter. And I'd love to see that sharing is caring. Please share this out with the people that you care about. And of course, you can send this directly from the podcast app that you are listening on. We have some epic masterclass world-class guests coming your way very, very soon. So, make sure to stay tuned. Take care, have an amazing day and I'll talk with you soon.

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