THE MODEL HEALTH SHOW

EPISODE 485

What Causes Cancer, The History Of Cancer Treatments, & Cracking The Cancer Code

With Guest Dr. Jason Fung

You are now listening to The Model Health Show with Shawn Stevenson. For more, visit themodelhealthshow.com.

SHAWN STEVENSON: Welcome to The Model Health Show. This is fitness and nutrition expert Shawn Stevenson, and I'm so grateful for you tuning in with me today. Today's episode is dedicated to one of the most prevalent to health issues in our world today, and it's the second leading cause of death in our culture, but there are solutions, there are big changes that are taking place right now with our understanding of this condition, and today, we're taking a deep dive into research regarding cancer.

Now, one of the most important things that we're going to be covering today is helping to remove some of the mystery around cancer to really demystify it, so we can understand what cancer is, how it develops, and what are some of the hallmarks of cancer. But equally important, we're also going to look at why cancer rates have continued to surge, despite billions of dollars being invested in cancer treatments every single year.

It's the second leading cause of death, and it's very, very close to the leading cause of death, which is heart disease, and once you understand the evidence from today, you're going to know exactly why this has continued to happen, and also we can start to point our attention most importantly towards what is real, what is most sustainable, where the real solutions exist because they do exist and there's so much growing evidence now, and we've got one of the leading experts in this topic in research and really putting the data together, and I'm so excited about this because this is another tool for empowerment, and I feel that this should be mandatory for citizens in our culture to learn about these things.

And at one point... My mission is that at some point here in the near future, that it does become common knowledge, but for that to take place, it really starts with us really being able to take this information to imbibe the information and to share it with the people that we care about, because just like negativity can spread positive, empowering information and education can spread, I believe even more rapidly if it's given the proper attention. So again, very, very excited and pumped about this episode, and one of the things that our special guest mentions now, there's a lot of things to still be uncovered in the realm of nutrition regarding specific treatment for cancer, that is still kind of murky waters.

We do know there's a tremendous amount of data regarding nutrition and immune system regulation, and immune system suppression or immune system avoidance. Because immune system is constantly scanning our bodies to seek out and destroy abnormal cells, as we'll talk a little bit about in this episode, but our nutrition is really geared towards optimizing our immune system function on that level, but as far as treatment, there are very few things that we know for certain.

One of those things, funny enough, is green tea. Listen to this, there was a study published in the journal 'Breast Cancer Research and Treatment,' and they found that women who drank the most green tea had an approximately 20%-30% lower risk of developing breast cancer. Right now, this is an observational study, but the results here are really promising. Another study... And this is a meta-analysis of 29 studies. And this was published in the peer review journal Oncotarget. And they found that people who drink green tea daily are around 42% less likely to develop colorectal cancer. These are two of the most pervasive and deadly forms of cancer, we're talking about breast cancer and colorectal cancer. We've got some data on these things right now.

Now, one of the other things that he's going to mention is the data connecting obesity and type 2 diabetes insulin resistance in cancer is crazy, it's crazy. But this is another thing that addresses part of that equation, a meta-analysis published in the Journal of the American Medical Association, Internal Medicine, so JAMA, they've got the best acronym. The Journal of the American Medical Association, the acronym is JAMA, alright, JAMA Internal Medicine.

Looking at the data from nearly 300,000 people found that drinking green tea can potentially lower the risk of diabetes by nearly 20%, another meta-analysis of 17 randomized controlled trials, alright, this gold standard, specific implement, looking at a specific implement. This was publishing in the American Journal of Clinical Nutrition showed that green tea has a significant impact on regulating blood sugar and also potentially improving insulin sensitivity.

Now, I've been drinking green tea for years, it's one of my favorite things, but the green tea that I drink most often is matcha green tea from Pique Teas, and the reason that I drink the matcha from Pique Tea is that they use a patented cold extraction technology that extracts the bio-active compounds from their teas at cold to low temperatures to actually get the compounds and keep them in a bioavailable form.

Now, this process effectively extracts all of the natural antioxidants and phytonutrients and preserves them in a whole form, and it comes in these really incredible tea crystals that it's easy to use, just pour them in the water, stir it up and enjoy the benefits. And the sourcing is top notch as well. It's organic, high quality extraction method, and triple-screened for toxins that are normally found in many of the tea products out there. They're coming along with... If you're just getting any random company X teas, oftentimes, they're coming along with pesticides, heavy metals, and there's even toxic mold commonly found in teas, and Pique Tea screens for all these things. You get the highest level of purity. Go to piquetea.com/model and you get 10% off your entire order. That's P-I-Q-U-E-T-E-A.com/model. Use the code 'model' at checkout to get 10% off your entire order.

Definitely recommend the matcha green tea, the Pu'er as well. And also, I love their ginger tea, it's one of my favorites too. So pop over there, check them out. Piquetea.com/model. Now, let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five-star review titled, “I've learned so much” by SamanthaLynnK14. "I can't get enough of this podcast, everything Shawn says is incredible, real studies and real science. Every podcast has a new lesson and I cannot wait to learn. My favorite part is the positivity while driving to and from work, this is exactly what I need. Thank you Shawn."

SHAWN STEVENSON: Thank you. Thank you so much for leaving me that message over on Apple Podcast, I appreciate it so much. And if you have yet to do so, I'm talking to you, please pop over to Apple Podcast and leave a review for The Model Health Show. Alright, it really does mean a lot. And on that note, let's get to our special guest and topic of the day. Our guest today is Dr. Jason Fung, and he's a physician, researcher, and New York Times bestselling author, and he's currently practicing medicine in Toronto, Canada, which is where he's joining us from today. His incredible books including 'The Obesity Code,' 'The Diabetes Code,' and now 'The Cancer Code,' have been transforming the health paradigm today, influencing many healthcare practices and also the public at large.

Now, in this episode, again, we're diving in and looking at what cancer actually is, what are the mechanisms behind cancer, what's happening with our surging rates of cancer in recent decades, despite billions, again, billions upon billions being invested into cancer treatments and not bearing very good fruit. What has been working, and most importantly, what do we really look towards to help to address this growing issue that has plagued humanity for so long, because I promise you there are solutions. So let's jump into this conversation with the incredible Dr. Jason Fung. Dr. Jason Fung welcome to the show. Thank you so much for joining us.

DR. JASON FUNG: Oh, great to be here. Thanks for having me Shawn.

SHAWN STEVENSON: Oh, it's my pleasure. So first question, what inspired you to put so much time and energy into cancer research, the data you've compiled is absolutely fascinating.

DR. JASON FUNG: Thanks so much. I think it's because I approached it from a different angle. I didn't actually mean to write a book about cancer. I've written a lot about weight loss, so as a kidney specialist, I deal a lot with type 2 diabetes, which is related to obesity, so I deal a lot with metabolic health and that kind of issue. And one of the things that was sort of on the periphery of that was cancer, so as I started to look into that relationship between obesity and cancer and type 2 diabetes and cancer, the story just got more and more sort of fascinating, and it's super interesting to me, because it was actually nothing that I had learned before, because I

went to medical school in the '90s, and the entire relationship between obesity and cancer, and type 2 diabetes and cancer really wasn't sort of fleshed out until the mid-2000s.

And a lot of the new data on the change from the genetic paradigm of cancer to this more evolutionary view of cancer was also brand new, sort of in the last 10 years or so, and this was all sort of new to me. I hadn't appreciated the massive change in the way that our understanding of cancer, it doesn't change sort of cancer management and so on, but it was sort of just this really, really fascinating understanding of what cancer is, how it develops, because that's something that we've never known, like what is this strange disease of cancer, it's completely different than any other disease that we encounter, and yet, it's the number two killer of Americans.

So if you look at heart attack, for example, we know what causes heart attack, you get a clot in an artery, a blockage in an artery, you get the hardening of the arteries, you get heart attacks. We know what causes infections like... There's bacteria that cause infections. We have viruses like COVID. Other diseases like ulcers are caused by other bacteria, so we've sort of figured out a lot of these diseases, we have genetic diseases, like sickle cell anemia and so on. So we've sort of figured out what causes these things. But cancer is such a fascinating disease because it's a disease that comes from ourselves, that is if you have lung cancer, that lung cancer cell developed from your own normal lung cell, so why, why would it do that and kill you, and it's not some rare disease that we've never heard of or ever seen. We see it all the time.

So for such a common, common, common disease, we really had no idea of what is going on and most people don't know, and I'll bet that most doctors also don't know about this sort of changing understanding of what it is and to me it was such an interesting shift in the last 10 years, because explains so much of cancer medicine that we could never explain, that is if it was a genetic disease, why is it so common? Why does everybody get cancer? Why does every cell in your body have the potential to become cancerous? Why does every animal in the animal kingdom potentially have cancer, like why is it? It's clearly tied into something very deep in our evolutionary past, but to put it all together was just so... To see it, sort of the science unfolding and so on was just so interesting.

So I'm not sort of a cancer researcher, I'm just trying to put the story together for people to understand, to appreciate how this disease has changed in the scientific view and the implication of that to how treatments are now progressing, that is we've sort of moved a little bit away from trying to fix these genetic changes, and we're trying to tackle it as an evolutionary disease that is using things like immunotherapy and adaptive therapy, and all these new sort of modalities of cancer medicine that are just so promising. So it's just trying to understand this disease, but to me, it's sort of the greatest medical mystery there is, and just to have a better understanding of it is just so, you know, so interesting.

SHAWN STEVENSON: Yeah, you know, and I love this. You even bring out some stories that have a parallel with yours, which is bringing out some outside perspective for cancer research, like they recruited some physicist at one point. We'll talk about that hopefully a little bit later. But you having a different perspective, a different paradigm is so valuable because you're able to look at this from a new dimension. What we tend to see is we end up with scientific tunnel vision, and when things are kind of commonly accepted as true, in medicine, we have to fight really hard.

And you've got multiple stories throughout the book as well about paradigms with cancer, and then new research affirming things that are factual, taking decades to change, but you also take folks through a little bit of the history of cancer to start out. And can you talk a little bit about that? Because cancer has been documented throughout the long history of humanity, this isn't a new thing.

DR. JASON FUNG: Yeah, it's a really interesting thing that we've actually seen cancer even sort of as far back as we can find in the fossils and so on. You can find ancient humans and ancient Egyptians, in the writings, they've talked about cancer and that was a very rare disease, because we know that cancer is a disease that tends to increase as you get older, and of course, life expectancy was much shorter, but it wasn't unknown. So one of the things that people often say is, "Oh, we don't know what causes cancer," and that's actually completely untrue. We know a lot about what causes cancer, in fact, you look at things like smoking. We know smoking causes cancer, right?

We know that certain viruses cause cancer. We know that there are genetic things which cause cancer. We know that asbestos causes cancer. So there are many, many things that we know cause cancer, those are called carcinogens. And there's a huge list of these carcinogens. You can find them on the internet. It'll probably take you three seconds on Google to find the World Health Organization and other organizations maintain these list of carcinogens. It's not that we don't know what causes cancer, we know lots about what causes cancer, it's how that sort of smoking or asbestos or so on, how that carcinogen leads to the development, that's the sort of part of the puzzle that we hadn't quite figured out, how that sort of moves from smoke, from the tobacco smokers, asbestos, to lung cancer or to mesothelioma or whatever, and that's where the science has been in the last little bit.

One of the thing that's super interesting is that in the '80s, '70s and '80s, they started to look at what are the most important causes of cancer. Smoking was actually the number one, and diet is actually number two. 35% of the attributable risk of cancer is attributed to smoking. So, 35% for smoking and about 30% for diet, so huge, like a huge impact and far dwarfing anything else, like radiation and chemicals and pesticides and all the other stuff that we worry about,

and we do so rightfully. But diet was this huge factor and that's sort of been untouched because there's all this debate about diets, and again, the new science of the last 10 years is just starting to unravel the link between diet and cancer. So that's another interesting thing, but we sort of moved...

SHAWN STEVENSON: Yeah, but that's the thing, too, is that you go through all the different paradigms throughout the book of what we believe cancer is and where it comes from, and I think it will be really helpful right now is to, number one, because we've talked a little bit about what causes cancer, but what is cancer? If you can give us a summation of what cancer is, and then let's talk about some of these paradigms, because we've gone through multiple paradigms, and one of the big pieces that came out not too long ago, were these kind of hallmarks of cancer as well. So let's talk about that.

DR. JASON FUNG: Yeah, so if you go back to the 1940s, these are the modern paradigms of cancer, they're sort of our three big ones. We started off as... And what I mean by paradigms of cancer is what we view as what cancer is. The first major paradigm was cancer is a disease where the cells just grow too much. The point is that if you have a lung cancer cell, it's growing all the time, so it's dividing, it's spreading, it's metastasizing. It's just growing too much, and that's what kills you in the end. If it grows too big, it'll damage other organs and it spreads around to the bones, into the brain. It will grow and damage the normal tissues, and that's how cancer often kills you.

And this idea that it's a cell that grows too much is... I'm trying not to be trivial, it sounds very basic, but it's not that basic, this is the '40s, and the paradigm is, why the paradigm is important because it informs how you treat it, that is if this is a disease where the cell grows too much, well, then the answer is kill it. That was the basis that formed the basis of all our modern treatments for cancer.

If you look at surgery, it's a way to cut it out. If you look at radiation, it's a way to burn. The cancer cells, and if you look at chemotherapy, which was the big sort of advance in the '40s, it's basically a selective poison. So you're trying to kill by poison the cancer cells a little faster than you kill the normal cells, so it's a selective toxin. That's really all it is. These are just ways to kill cells, and that's... Because your paradigm, the way you view cancer is that it's a cell that grows too much.

It doesn't tell you anything about why it's growing too much, but it's a valid way. And of course, it was a huge advance. So if you look at the chemotherapy through cancer, there was very little treatment before the 1940s, we started to develop these chemotherapy drugs in the '40s and '50s and '60s, and then the major advance was combining these, the chemotherapies and

different regimens, so now you need to start to say, okay, let's use this plus this and this plus this, or this, and then we'll give it three weeks, do it again and then do this and do this.

So it was just a way to sort of refine our way of killing cells, I would say. Oh, let's do surgery, and then chemo or then surgery plus radiation plus chemo. And we did all these trials and it was a huge success for its time, so it took cancer from no treatment to some very successful treatments. A lot of the pediatric cancers for example, very high cure rates, but the main cancers that affect people... The things like breast cancer, colorectal cancer, unfortunately didn't do as well, but a huge advance. And that took us up to about the '60s and '70s. And the next big sort of paradigm shift in cancer came with the advent of the genetics revolution.

So we started to understand that, hey, the genes in our cells actually are what's telling us cells to grow or to not grow, so if you have a genetic mutation in a cell and that gene mutation is a critical area that affects cell growth, well, you could get excessive cell growth. So this paradigm that these are genetic mutations, genetic changes, which are affecting growth, doesn't invalidate the first paradigm. It's merely trying to build on it, that is, we accept that cancer is a cell that grows too much, but why is it growing too much, and that's the next great paradigm shift, it's a genetic mutation that causes the cell to grow too much.

So you're not trying to say, oh, that was wrong, and this is right, we're just trying to say, okay, let's expand our understanding, and that's what science does best. So we started to find these genetic mutations and then they discovered in the sort of early '70s, '80s, these oncogenes, so these are genes that control growth, and sure enough, when you started to look at cancer cells, you could find these genetic mutations, so that was a huge validation of this genetic paradigm of cancer, and that's sort of where we've been from the '60s, '70s, all the way to the 2010s.

So the first few treatments were super, super successful, so there's two drugs, one called Imatinib for any type of leukemia and another called Trastuzumab, which is Herceptin for breast cancer, and these were great drugs because they were not drugs that were designed to kill cells, so it's not like chemotherapy. Oh, we tested it and we killed a lot of cells. This was a drug that was designed to fix those genetic mutations, so Imatinib which was the first sort of great drug. We identified the sort of problem genetically, and this was a drug that fixed it, and when it did so, it completely changed the life of these people. It was practically curative.

It went from, people went from sort of a death sentence to a relatively normal life with this one pill. It was just incredible. So, and Time magazine had it on its cover, that was how important this was. Herceptin, which is Trastuzumab for breast cancer was similarly, just a fantastic drug, it was... So they identified these mutations, called HER2/new mutations, and they recognized that not all breast cancers had this mutation, so if you gave this drug to everybody and only 20% of people had this mutation, well, you're treating 80% of people, that

are not going to benefit. So, in another huge advance, they said, well, what we're going to do is design a test to see if you have this mutation, and if you have this mutation, then you give the drug.

So that's great because you've got this expensive drug with lot of side effects, but you're only giving it to those people who are going to benefit. So, that ushered in the sort of era and the promise of personalized medicine, that is the drug that we give person A is going to be different than the drug we give person B, based on a test that we can do to see what kind of breast cancer they had. So, not only genetic treatment, which was huge, but personalized medicine, so personalized targeted medicine.

So by the 2000s, we had these two drugs and that was like it. We were like, we are on the verge of curing cancer boys. That is how optimistic we all were. We thought this was just going to be done. So by 2000, we started talking about the human genome project, and so the idea was you'd map the genes of a full human being. I remember at the time, I mean, it took like five, six years. It took hundreds of millions of dollars. I mean, I think you could get it done in 24 hours today, but at the time, it took a long time to do this.

And in 2000, it sort of finished, the human genome project finished. And we said, okay, well, that's it. All you have to do is look for this type of cancer, so breast cancer, you have these three or four mutations, find the drugs; colon cancer, find these two or three mutations, find the drugs that are going to cure them, and you're going to cure every single type of cancer, that's how... That's what we thought, that's what we really believed, we're on the sort of precipice of a cancer-free world.

But unfortunately it didn't turn out that way. That is those first few drugs were still the best. They were basically... If you look at the number of drugs that came after that, that were that successful, I don't know if we've replicated it since. So in that 40 years of the genetic paradigm, we had two great drugs. And then now, if you look at the number of drugs that have made a significant difference it's probably... You could probably count it on one hand. That's not a lot of progress. And if you look at what happened to that story of, hey cancer is this one or two or three genetic mutations in a critical area of the gene, and that's causing it, we fix it and you're done, it didn't work out.

Because as we started to get the technology, we did this Cancer Genome Atlas, which was a big project. So instead of mapping the genes of one human, we mapped 33,000 cancer samples and we did the full genome of all these cancers, and then we were going to take, say, all the colon cancers, match 'em and say, "Okay, these are the three or four critical genes." When they did that, what they found was not three or four genes that were mutated. I think at the last count, it was something like 6 million genes that were mutated.

SHAWN STEVENSON: Hold on. Hold on. Six million different gene mutations are linked to cancer.

DR. JASON FUNG: Exactly. It was crazy. So they have this database called the COSMIC database, which was this worldwide database of all the gene mutations of cancer. So if somebody has a cancer, they mapped the genes and they said this is it and they put it on the database, and it was complete bedlam. So even by the mid-2000s, 2010, where you could find out that if you take one colon cancer from patient A, it's not that he has two or three mutations. He probably has 50 to 100 different mutations in various genes. And if you look at the person next to him in the cancer clinic or the person next to her, they would have 50 or 100 mutations and completely different than patient A.

So it's like this is going to be a huge problem because we can't treat somebody with 50 drugs. We don't have that many drugs. And the other thing is that you could use 50 drugs on patient A and you'd need 50 completely different drugs for patient B. It's a complete mess. You can't develop six million different drugs. It's just an impossible task, and that's why the progress in cancer came to a screeching halt because of this paradigm. Because we had already reached the limits of paradigm one. There's only so many ways to kill cells without killing somebody. It's hard to do. Chemotherapy, new drugs.

So then the genetic paradigm was much less toxic than these other drugs. But the problem was that there's just too much variation and the whole problem is that if you look at the progress in cancer medicine, there was very little progress compared to the rest of medicine. So for example, heart disease. So I compare heart disease and cancer a lot because they're the number one and two killers of Americans. And if you look at the 1960s and 1970s, you're twice as likely to die of heart disease than you were of cancer. But the progress in heart disease has been quite steady.

So you look at death rates from heart disease, they've been actually trending down slowly but steadily as you have better drugs and better procedures and better technology and less invasive this, and their mortality from heart disease has been steadily going down, but cancer has stayed relatively flat. And therefore the rates of death from cancer and heart disease are about the same. So we went from something which killed twice as many Americans... Heart disease killed twice as many as cancer to almost the same, which means that relatively progress in cancer medicine has been very, very slow. In fact, if you look at survival after breast cancer, colorectal cancer, that survival hasn't gone up a lot in the last 30 or 40 years. The treatments just haven't kept up.

SHAWN STEVENSON: A big part of that, in your research, obviously is attributed to getting stuck in a paradigm where we're focused on these gene mutations. And then once this was actually mapped out, seeing that this was far bigger of an issue than what was once thought about. Now, what I would like to do, which is so wonderful, you highlight these throughout the book, is what are some of the causative agents behind gene mutations in the first place and addressing these, which this is still pruning the edges, but still this is an important thing. So some of the things... When we think about a gene mutation, we think that it's just a haphazard.

Like there's this imminent gene mutation that's going to cause cancer. In a lot of the cases, that's a very small percentage that it just happens on its own. You mentioned this term earlier, and I want to dive in deeper here. You mentioned the term carcinogens. And so these are cancer-causing agents. These are things that effectively contribute to these gene mutations that can lead to cancer. And you mentioned this and I do not want to bypass this. This is one of the times I had to put the book down and just think about it for a moment, how crazy this was, and one of those carcinogens really early on that was identified was asbestos.

And you talked about the story of Dr. Leroy Gardner and his research around asbestos and unfortunately the suppression of the data for about 40 years and the connection with mesothelioma, that form of cancer. Can you talk a little bit about that? These carcinogens. In particular, let's talk about asbestos a little bit.

DR. JASON FUNG: Yeah. Asbestos has been used for a lot of years. So you can find mentions of it in Ancient Rome and so on. And interestingly enough, they knew it caused a lot of lung disease because the workers in those asbestos mines, they would often get lung disease. So they were not doing so well. However, it became one of the important materials of the industrial age, because as we started to build these great big engines and we had coal fire this and power everything, the big risk was fire, especially on Navy ships.

So as you got to World War II, people started using asbestos everywhere, because it was fireproof, that was the main thing. You had this light material that you could weave and you could make it fire-proof. And that was great because if you're designing something where there was going to be a big engine, then you could make it fire-proof, you can improve the safety of it. And that translated into the home. So they took that technology from World War II Navy ships, and they basically said, "Well, we're making all this asbestos, the war is over, let's put it in the homes."

SHAWN STEVENSON: Okay.

DR. JASON FUNG: Because it was one of these things nobody anticipated. But of course, you know that if you buy a home prior to the 1960s or something, there's a good chance it could

have asbestos in it, and you have to go and get somebody to take all the asbestos out. Even now, if you buy a house, you need to be aware of that. It's actually one of these things, and the real estate agent must disclose, it's by law, you have to know about it because it's such a dangerous thing. But anyway, so because this was such a great fireproofing material, it wound up in all the HVAC areas of the home.

The heating and cooling because you had a furnace and you didn't want the furnace to catch the wood that the house was built on, you didn't want the wood to catch on fire, so you'd wrap it in asbestos and all this stuff. So almost all the houses built in that era prior to us knowing about it, showed that asbestos was there. So Dr. Gardner... But there's a lingering doubt about asbestos and cancer. It causes cancer of the lining of the lung called mesothelioma, and there is some worry that asbestos could cause this cancer.

So they hired Dr. Gardner to prove that it didn't, unfortunately, it proved that it did. So when he gave all this asbestos to all these mice, all the mice that got asbestos basically got lung cancer, this mesothelioma and the other mice didn't. So clearly it was a problem. But he was employed by the big asbestos companies, which there's a couple of big asbestos companies. And they basically said, "Look, look at your contract, it says that we paid for the research, we decide what to do with the research." So they basically shut it down, they said, "You can't say anything, you're contractually bound not to say anything." And it just killed him, he was like... Later on, it all came out in the litigation of the 1980s, it turned out that...

SHAWN STEVENSON: And this was in the 1940s?

DR. JASON FUNG: Yeah, this was in the '40s, 'cause that was the World War II era, right? So it was crazy because here it was, the research that proved that it caused cancer, the big asbestos companies said "No, this research is not going to see the light of day. We're not doing it because we're putting it away, we're shutting the door, and that's it." So he couldn't say anything, and then, of course, later on, everybody found out that it did cause mesothelioma because this was a cancer that nobody ever saw before, and now you started to see it in all the asbestos workers and people who are working with HVAC and stuff, they were all getting mesothelioma, it became quite a common cancer.

So, from very rare to very common, and it's like, "Well, what's the link?" And it's like, obviously, it's asbestos. So eventually, it came to life that it did cause it. And then those big three asbestos companies, they got sued, and in that litigation process, they subpoenaed all the staff. And so it comes out that, hey, they knew about this all that long ago, and just didn't tell anybody and I don't know how many thousands of lives it cost, but it was tragic. And it was all because they wanted to preserve their business, it was crazy.

SHAWN STEVENSON: You put this in the book that mesothelioma in that timeframe, jumped up 1.5 million percent.

DR. JASON FUNG: Yeah.

SHAWN STEVENSON: It's insane.

DR. JASON FUNG: It's insane.

SHAWN STEVENSON: It's insane. And it's just, again, it's a common practice to put this stuff in our homes, and it's just like nobody thought twice about it. People are very trusting. And one thing I really noticed in your book is a stunning amount of times that factual new insights about cancer and medicine came along throughout history, and it was shunned or even demonized by the scientific community until sometimes decades later when it's finally acknowledged, it's factual. And the thing is, and I know this for certain, I know you know, it's happening today, still we think we're so evolved, but we're doing many of these same practices of thinking science is definite, this is the end thing, and there's no other discussion around it when we have very glaring things like this.

I remember when I was a kid and I would see the commercials coming on, do you have mesothelioma from... Call Brown & Brown and get your settlement. And now today it's just like, oh, of course, asbestos is like a thing of the past, nobody would ever do anything like that. But we're still existing in that paradigm, and one of the other things I want to ask you about, because there's a ranking that we have now, the IARC for example, the International Agency for Research on Cancer, got a ranking of carcinogens. We've got...

We know what causes cancer, we know some of the strongest carcinogens. But then there are these category of probable carcinogens as well, that's getting a lot more data. One of those being shift work, for example, night shift work is a class group 2A carcinogen, which is a probable carcinogen, which is something that causes these gene mutations that are linked to the development of certain cancers. For example, one of the things I talked about earlier in one of my books, in 'Sleep Smarter,' was a study done on nurses who were working overnight and seeing the prevalence of 30% greater incidents of breast cancer, for example.

So again, we know so much about these carcinogens. One of the other ones I'd love for you to highlight, you mentioned a little bit early, I've got to pull out from you a little bit more, is that we know that certain viruses are carcinogens as well. Can you talk a little bit about that?

DR. JASON FUNG: Yeah, that was also a very interesting story too. And this was something unexpected that, hey viruses can cause cancer. So when it came out, when people said, "Hey,

viruses might be a cause of cancer." People thought it was crazy, just crazy, and they said, "No way, it's not an infection, right? We know what viruses do, and they don't, they cause respiratory illness and they cause this and that but they don't cause cancer." But then it turned out that they actually identified certain early cancer. So this fellow in Africa, you have this Burkitt's Lymphoma discovered by this surgeon, Denis Burkitt.

And what he did was he sent it back to the UK, got the samples analyzed, and what they found was viral inclusion. So they found that this Epstein-Barr virus was actually causing this huge Burkitt's Lymphoma in African kids, whereas this virus is actually wide and didn't affect anywhere else, which is very strange. And they thought that perhaps it may be related to Malaria, for example. But this idea that viruses could cause cancer was sort of electrifying. Now, on the one hand, it was terrifying because it means that this is a transmissible disease, you could transmit cancer from person to person, but on the other hand, you could do something and identify it. So it was a double-edged sword.

So they actually sponsored this big, big special virus... Cancer program, and they poured a ton of money into it, and they actually didn't find very much. So by the '70s, they shut it down. It fell into this sort of disrepute, this idea that cancer can be caused by virus. So they're like, "Yeah, sure, maybe a few viruses can cause a few cancers but it's not clearly not an important cause of cancer." And it got shutdown by the '70s, everybody forgot about it, but then the funny part was that all these other cancers started to become associated with viruses. And a lot of the Nobel prizes got awarded to this.

Cervical cancer, for example, got linked to Human Papillomavirus for which we now have a vaccine against Human Papillomavirus, for example. Hepatitis B, we know is a cancer causing agent, Hepatitis C is a cancer-causing agent. Bacteria such as Helicobacter pylori, which causes stomach ulcers as well, that also caused cancer, which was interesting and it explained a lot of why it was so prevalent in East Asians. So when you looked at China and Japan and so on, they had a ton of stomach cancer, and people in America didn't.

And it was like, "Why is that?" "We had no idea, we thought maybe some kind of genetics." But when those people from East Asia came over to America, all of a sudden their rates of stomach cancer just plummeted, and why is because they didn't have the same crowding and the sanitation was different. So H. Pylori was much more prevalent in East Asia. And in fact, didn't actually start to... The stomach cancer has been steadily dropping since the '30s, and we hadn't even no idea why. It's just because standards of living and sanitation were getting better, so there's less transmission of this Helicobacter pylori.

So both viruses and bacteria can cause viruses as well. So these are all classified as class one carcinogens, well-established carcinogens now. But that was the sort of great part about the

genetic paradigm was that it sort of linked things like physical agents, so chemicals like asbestos and tobacco smoke and viruses, because it said, "Hey, what's the common mechanism of how you go from tobacco smoke to a cancer cell?" And you say, "Well, it causes it through this mechanism of genetic mutations." And you can do the same thing with viruses, so viruses also cause genetic mutations and therefore lead to these cancer cells.

So it's sort of that, for the time, it really tied everything perfectly together, and that's why it became the sort of dominant paradigm up until the 2010s, which is where we hit the low point. We were stuck, we had nowhere to go, and then luckily we went on to this new paradigm of understanding. Because there were other things that cause cancer that we knew about, but we didn't know what was going on, things like stomach acid. So when you get gastroesophageal reflux, you would get damage to the esophagus but there's no extrinsic agent, it's your own stomach acid, it's coming back up, it's causing damage and it causes cancer.

Inflammatory bowel disease was causing cancer, so there's a lot of things. Lupus had a higher risk of cancer. So there is other things that were causing cancer that we didn't know and didn't quite link to that whole paradigm, but we thought, "Well, it must be just a genetic thing." So that's why that genetic paradigm really took off and everybody was all in on it for so many years. The amount of money that went into this paradigm must have been mind-boggling, 'cause practically every cancer researcher in the world was following this path that...

When you look at things a certain way, everything is colored by that, you say, you're always thinking in the genetic paradigm. What could it be doing? How can you do this? And that's why we made so little progress because it wasn't that there was no genetic mutations, it was that there's too many genetic mutations. And then you get into the next step, which is, okay, now we have to understand what's causing these genetic mutations.

Because the problem with the somatic mutation theory, which is the genetic paradigm, is that it assumed that these are random mutations. Because when you have asbestos or we have tobacco smoke, it doesn't cause targeted mutations to one specific gene. It doesn't go there and say, "Okay, I'm going to zoom in on the growth gene and mutate it." It doesn't do that. So the idea was that this was a random mutation that is it causes random mutations, and by chance, one of them will hit the right place to cause a cancerous transformation.

And that was the idea, is it's just random thing, but the problem was that this is clearly not a random disease. That is, if you look at cancer, it's a very stereotype disease. That is, there was these hallmarks of cancer that were similar no matter what cancer you're talking about. And it didn't matter that you had 50 mutations on this side and 50 different on this side, they still

acted the same, so clearly, whatever was going on, it was not a random thing. So what was behind that, and that was what led to this newer understanding, which I found so fascinating.

SHAWN STEVENSON: So in talking about those hallmarks, if we could just touch on this really quickly, because I think it's important for us to help to demystify cancer a little bit more. With the Hallmark being... With cancer being this excessive or even unstoppable growth, it doesn't have an end point like a normal cell, for example, having its normal cell replication, hitting the Hayflick Limit and going into senescence where the cell has this kind of program cell death effectively. But cancer doesn't do that, it doesn't subscribe to the same rules when a cancer cell develops.

So can you talk a little bit about a couple of these hallmarks of cancer, what we know cancer to be, because again, you just mentioned it, it seems like it's just this random thing, but there's so much that we do know. And for folks to be a little bit more empowered and how cancer is operating, what it is.

DR. JASON FUNG: Yeah, so it was an interesting thing because cancer had always divided itself into different cancer. So there's lung cancer and divides based on the cell of origin. So breast cancer is this and you have different treatments, and Lymphoma is this, and you have different treatments. So I talk about this fundamental difference, called the lumper-splitter problem, which is a whole term from Charles Darwin actually. And it was an idea where when you're talking about species or you're talking about anything, there's two types of people, the people who lump everything together, and there's the people who split everything apart and they give you different information.

Because if you lump everything together, you get an idea of what makes them common. If you split everything apart, you highlight their differences. And cancer medicine had always been a splitter, so it splitted between breast cancer and lung cancer, and liver cancer and pancreatic cancer and you treat them all as separate diseases but you don't treat them all as one disease of cancer. So, interestingly, it took until about 2000, so it was not until quite recently that a couple of researchers, very influential researchers decided, "Hey... " So they actually met in Hawaii at this conference and they're talking about this problem and they said, "Hey, we should really look at what makes cancer, cancer. Let's forget breast cancer and lung cancer and liver cancer. What is it about all these different types of cancers that makes them the same. Not what makes them different, what makes them the same."

And so they decided, "Okay, we're going to get to work on it." So they published their paper in 2000 called, The Hallmarks of Cancer, and they laid out six things that they said were fundamental to the diagnosis of cancer, any cancer. And they didn't really think much of it in their writing about this, we didn't really think much about it. They published hundreds of

papers. So they thought it was just another paper, it turns out it became the most influential paper in the history of cancer medicine. And it was because they were basically lumpers in a sea of splitters.

So nobody had really thought about this disease the way they had, which was, "What is it that is the same about these cancers?" And there's technical things like the cells grow and they become immortal, but you can break it down into sort of four essential things that one, they grow. Normal cells don't grow, that is, if you have a normal lung, it doesn't just keep getting bigger and bigger until it pops your head off sort of thing, right? It just stays the same size if you're an adult. So cancer cell doesn't that. It will keep growing and growing until it pops your head off, and that's how it kills you, so they grow.

Second is that they're mortal cells. And this was a great book called, 'The Immortal Life of Henrietta Lacks.' Henrietta Lacks was this lady who had cervical cancer, they took her cells without her consent, of course, 'cause this was very early on, and those cells just kept replicating, you can just keep growing them in culture over and over and over. And they still do that now. This is like 80 years later or something like that.

SHAWN STEVENSON: Rooted from her cells.

DR. JASON FUNG: Yeah, her original cells.

SHAWN STEVENSON: There's like the tons and tons of her cells being used all the time.

DR. JASON FUNG: Yes, they just keep getting over and over. Now, you can't do that with a normal cell. So if you took my liver cell, you can't keep growing it. After a certain number, like 40 replications, it will stop dividing. And we know why. It's called the Hayflick Limit, and it's controlled by telomeres, which are these little end caps on your chromosomes. Every time you divide, it chops off one of these telomeres. When you lose your whole telomere cap, the cell says "That's it, you can't divide anymore." So if you took my cell, which is non-cancerous, put it in a cell culture and you kept growing it over and over, after a certain period of time, it would just stop and there'd be nothing you could do.

So they're mortal cells, but the cancer cells were completely immortal. So they grow, they're mortal, they move around. So cells don't move around. That is your liver doesn't just jump into the blood stream and go hang out with your eyeball. It just doesn't do that. So cells are put in their place and they're tightly controlled. You don't just move around all over the place, but cancer cells do. And that's a very strange behavior. And then the fourth thing is that they have this very strange way of generating energy that is different than normal cells. So normal cells

like... We use oxygen in a process called oxidative phosphorylation and we generate 36 ATP, which is a unit of energy.

So for each glucose molecule, we get 36. Cancer cells don't do that, even in the presence of oxygen. They will use anaerobic respiration, which is they use glycolysis, which gives you two ATP plus two lactic acids. So instead of generating 36 ATP, which is 36 bundles of energy, you get two plus lactic acid. So it's like... Well, this is weird, because if you have a cell that requires a lot of energy to grow, why are you not using this form of energy generation, which gives you 36. Why are you using the two? It's like buying a sports car and then taking out your 200 horsepower engine and putting in a lawn mower engine with two horsepower. Why would you do that? You want to go fast. It's like, why are you doing this?

So that's another very strange anomalous behavior of cancer cells. So they put together those six plus two more they added in an update in 2011, and they said these are the hallmarks of cancer. And that's what led to this part of the process of understanding what it is that's going on in the cell, like how are we looking at cancer that they are the same. And that's this evolutionary paradigm, which we currently find ourselves in, which again is an attempt to explain what is causing all these genetic mutations. So it doesn't invalidate that there are mutations. It's trying to explain what is causing those mutations.

SHAWN STEVENSON: Yeah, and it's such an important just fundamental insight that a lot of folks aren't educated about. Especially if they have cancer or have cancer show up in their families, still not being educated about these very basic tenets, and still just shrouded in mystery. It seems so random and it seems like we don't know what's happening, but we do. And now, I think this is a really good point because the truth of the matter is that billions are funneled into cancer every year, medications, research, and yet we probably have effective treatments in the ballpark of maybe around 1% of them. And we've got so much that is effectively being wasted and a big part of this, this is one of our favorite parts of the book, has a lot to do with surrogate outcomes and folks really understanding what that means, and so can you discuss a little bit of the data on that?

DR. JASON FUNG: Yeah, and this is the part... The same as what we were talking about earlier with how companies can suppress the research that can be life-saving. And a lot of this is the same and it stems from conflicts of interest, that is if you have... It's to do with who funds the research. If you have a corporation which funds research, well, obviously, they're only going to publicize research that is going to benefit them. And they have every incentive to disregard everything that doesn't.

So when you do a study, as the public, we want to know is it effective? That's not what drug companies want to know. They actually don't care if it's effective or not. They want to know,

can we make money? It's a very fundamental difference. And there are many ways that you can structure a study that can make it seem effective, even though it's not. And these are the surrogate outcomes. So the only... As patient, what you want to know is, does it keep the cancer away and do I live longer? That's what's really important.

But what happens is that those outcomes often take years. So in around the 2000s, the FDA, in an effort to get more cancer drugs available, decided to loosen up the restrictions a little bit. So they said, "Well, instead of having to prove that people live longer, with this drug, with the chemotherapy that you're trying to test. We can use surrogate outcomes." And so there's something called progression-free survival, and there's other things like partial responses and so on. So, that if you, for example, could show that your cancer shrank by 50% or something like that, you could then say, "This is an effective medication." And then you could apply to the FDA to, say, approve my medication, and then you can start selling it and you can make a lot of money. But the problem is that those surrogate outcomes don't reflect the outcome that you want, which is, do you survive longer? Which is overall survival.

So that's a big, big problem because you wind up with drug companies that have every incentive to move those goal posts as far forward as they can, so that these drugs look effective even if they're not. And there's been many, many examples where this has been a problem. So the FDA, to its credit, had said when they relaxed these standards that, okay, we're going to let you get approved on these sort of easier outcomes on the studies, but you promise to do the good studies afterwards on Scout's honor. That's what they said, because once it's approved, it's approved. And they said, you promise to do that and we'll be all good.

It turns out that most companies didn't do that, they didn't do the studies that came afterwards, because if you're approved, why would you spend money to do a study that might show that your drug actually isn't useful and therefore is not effective and you're going to have to take it down. They have no incentive to do that. So they kept doing that, and it's the same as the asbestos company. If you fund the research, there's a conflict between sort of truth, scientific truth and the corporations sort of bottom line, so that's the conflict and so...

So that's why it's so important to look at who funds the research in these things, and fortunately, almost all research is funded by pharmaceuticals, which is how you get all these drugs that are marginally effective, but they cost so much money, and it's sort of heartbreaking because it's one of the big reasons for personal bankruptcies and stuff, and this is... There's already been a couple of drugs where they've... When they did the actual study, it showed that the original drug wasn't that effective. There are so many examples where we have marginal, marginally effective drugs that people say, "Wow, it's a breakthrough because of this surrogate outcome," whereas the data, the studies showing that, "Hey, does this

surrogate outcome actually link to the outcome of interest? We know that they don't. So, we just don't understand why are you allowing it, it doesn't make any sense."

SHAWN STEVENSON: Right. And it's a common practice that you've outlined in the book multiple times.

DR. JASON FUNG: Because the whole of cancer medicine is like that now.

SHAWN STEVENSON: And so what will happen is they'll put them... They'll use a surrogate study, get the drug out on the market, make a few billion dollars, and possibly on occasion the FDA will catch this and then have them pull the drug after they've already racked up billions of dollars, and this again, it's a common practice.

DR. JASON FUNG: Yeah. It's a common practice. It's a horrible practice. But unfortunately, if you look at the data, it's clearly what's happening now, there's ways to game the system when you do studies like... For example, if you were to say, okay, I'm going to compare drug A to drug B, you think, okay, if I make drug A, I want to show that's better than drug B. Well, if I'm the maker of drug A, I can choose what drug B is, so I can choose the worst thing, right, it's like... So therefore, you can do the study and say, "Look how good drug A is compared to drug B," that's like... But then people will look at it if they wanted to and say, "Well, but drug B is nothing close to what we would normally use," so, you're choosing your competitor.

And that's what happens when you allow the drug company who has a vested interest in proving that this drug works, you're allowing that person to do the study, it's like marking your own test, right? It's like, if I mark my own SATs, I can get a perfect score, right? It's like that's the same thing, you allow them to design the study and it's happening to a degree, in fact, that's unprecedented, because not only do the drug company, they fund the study, but they find the people to do the study, and increasingly, when you read the medical literature, they're actually the ones writing the study in the journal, so the whole thing is basically, they're tilting the field as far as they can towards showing that this drug is effective when it may or may not be effective.

And unfortunately, sort of like 80%, 90% of the drugs are not much more effective than the old drug, what's available, but they cost sort of like 10 or 20 times more. So that's the sad part about it. It's a lot of people gaming the system to get sales, and it's obviously worked for them.

SHAWN STEVENSON: And now there's a new model as well that just came into existence pretty recently, which is the FDA itself being funded by money coming from pharmaceutical companies itself, I think somewhere around the ballpark of 40% of their income is coming from pharmaceutical companies, so saying being able to literally write your own checks, write

your own approval, it's just getting deeper and deeper. And I'm so grateful for this conversation because literally millions of people, they invest sometimes everything that they've got to try to save their loved ones, all the money they've got, they pulled out... Put a second mortgage on their home. They do whatever it takes to try to save their lives with oftentimes, drugs that are framed to be this potential life-saving thing, and more often than not, it's not even anywhere close to that.

And you mentioned this earlier, and this is what I want to point back to, drug costs are the single largest cause of personal bankruptcy in the United States. People really don't get that. People are literally betting the farm trying to save the lives of their loved ones and themselves, so let's talk a little bit about the rising prices of cancer medications, because this is one of the biggest areas. You mentioned one that actually had really great effectiveness. Imatinib, you mentioned that a little bit earlier, and the cost to the manufacturer to make, this is highlighted in your book, the cost of the manufacturer to make is estimated to be about $216 a year. The cost to the customer to get that drug is about $120,000 per year. How is it possible?

DR. JASON FUNG: Well, I think that what happened was that the drug when it came out was not even that expensive. It was a few thousand dollars. And when they priced it in 2000, roughly in the early 2000s, they thought it was ridiculous. It was very high priced for the time, but like a tenth of the cost of what it cost today, like a few thousand dollars a year not like a few hundreds dollars a year. But over that time... So this is the same drug, it just... They kept raising the prices and because it was so effective, it didn't matter how much it cost to me, it only mattered how much people were willing to pay for it. They kept raising the price, something like 5% over inflation.

So even though it's the same drug, the prices just kept going up and up and up. And it's not like it's a new drug, there's no new anything, it's the same manufacturing process, it's your same factory that's making it. And as competitors came on board, they didn't lower the price. Because this is usually what happens when you have generic drugs, so you see you have one drug and another... And the patent expires, another drug company comes in and they say, "Well, I'm going to cut the cost in half, that's how I'm going to compete at a lower cost."

But the new manufacturers, when the patent ran out and made a new second generation, they didn't lower the price, they raised the price. So basically, they're colluding to raise prices because they know that they could drop the price. They could drop the price by a hundred fold, they'd still make a huge profit, but by colluding together, they would actually make a lot more money. Remember, baseball had that collusion thing a long time ago, where they're basically trying to screw the players? This is the same thing. The drug company is basically colluding to raise prices. So they have this understanding that they keep the prices high.

Therefore the consumer, which is us as a public, we have no choice, because you go with manufacturer A or B or C, they're all really high price, they're all a few hundred thousand dollars. So you're screwed no matter where you go, and all of them are just making money. So if one of them drop the price, of course, if one of them falls out of collusion, then the bottom would drop out of the market, but nobody has any incentive to do that. So the prices kept going up and up and up and far in excess of what normal inflation was.

I always think back on that show, remember 'Breaking Bad,' this is such a great show, right? I mean, the whole reason he started selling crack or crystal meth was cancer cost. Even at, I don't know when this... When did it come out in 2010, something like that. Even in the 2010s when that show came out, the drug costs were already so ridiculous that it was reasonable for the high school teacher to sell crystal meth to fund his cancer medicines, right? It was already believable at that time, and it's not gotten better, and unless people know about it and start to make noise about it, it's going to keep happening, it's collusion.

Like this whole idea of drug companies funding studies to make their own drugs look better, raising costs, passing costs off, you have all this conflicts of interest, not only within the industry, but like you said, with the FDA, but also researchers. For example, when they research often they go to a drug company, so they know that there's a hugely lucrative job waiting for them as long as if you're a university professor, you don't want to rock the boat because you might be going to work for that guy in a couple of years for a couple of million bucks, so why would you come down on the drug company and say, "Oh, you're such a... This is the wrong thing?"

And I always say, I didn't mention this in the book but it's like it's such a screwed up practice really, where drug companies are really allowed to pay doctors and researchers whatever they want. There's a huge conflict of interest because it's like you can't pay a policeman, like if a company tried to pay a judge or a policeman or even a newspaper journalist, then we would be like, "You can't do that, you can't just pay people." But the drug company can pay the researcher however much they want, and it's usually in the six and seven figures. So now you have this whole group of doctors and researchers and stuff, and I know because I'm not on the inside of academics, but I'm in medicine, I see it all the time.

You have these people getting huge payouts, you have doctors getting free meals and free this and free that, and why would we allow that as the public, why wouldn't you just say, "You know what, I don't think drug companies should be funding studies on their own drugs. Why would you allow that?"

SHAWN STEVENSON: It just sounds obvious. Sounds obvious.

DR. JASON FUNG: Yeah.

SHAWN STEVENSON: And there's laws against these things, there's laws against collusion and price gouging, but it seems to not apply here for some reason. For some strange reason...

DR. JASON FUNG: For some reason, yeah.

SHAWN STEVENSON: This is acceptable unless... It takes so much for these things that come to light, and it's in the minority. It's a very rare occasion when it would happen, and so it hasn't gotten better, it's continued to get worse, and it's becoming... And I think that a big part of it is that we've come to accept it as normal. The public just doesn't... It's in the background, just like, "Yeah, that's going on. What can we do about it?" And not understanding that we're really steamrolling this situation to where again, drug cause are the single largest cause of personal bankruptcy, and it's not okay, this is not about saving lives.

If we've got a medication that can actually save lives, and this was something that was altruistic, of course, we want people to make a profit, but it's not about that. This is literally creating a situation where we're taking advantage of the public in a hideous way.

DR. JASON FUNG: Yeah, and in a way that is unique, that is not available to other industries. We don't accept it in almost any other industry. But we accept it in medicine, and it's like why... But when you have bad medicines that cost too much, it affects every single person in this country, so why allow that? That's what I don't understand sometimes, is why we allow that, and maybe it's because you have to think about these problems a little bit and it's sort of hidden a little bit because you get into this state where you say, "Oh, this is a breakthrough, this is a breakthrough." And I did talk about this where there's been so many breakthroughs proclaimed in the newspapers about cancer, and yet cancer just kind of goes right along, there's no breakthroughs going on, it's just the perception of...

SHAWN STEVENSON: Right. It's a fake through.

DR. JASON FUNG: Progress. Yeah, it's exactly.

SHAWN STEVENSON: So this is the part about your book that is the most affirmative and really enlightening, which is we don't have to participate so heavily in that universe, again, there are some effective medications that have been discovered, but we're talking about a tiny, tiny percentage. For the most part, it's understanding more so what are the causative agents here behind cancer, and let's operate at that level where it's actually effective, and you give this great analogy that I think it's just really a game changer of the seed and the soil. So let's talk a little bit about that.

DR. JASON FUNG: Yeah, so the seed is really about the sort of dynamic changes and how the evolution is playing a role in changing the... Causing these gene mutations, but there's actually a lot more to it than that, and it gets hidden by this genetic paradigm that it's sort of this genetic lottery system, but it's not... Because if you think about a seed, you can have the same seed, you plant it in soil, it grows. You plant it in the desert, it doesn't grow, same seed, different soil.

So clearly, the environment plays a huge role. And what we've lost sight of by looking so closely at the seed, which is the genes, the gene mutations, the evolution of it, as we forget that there are populations in the world that have virtually no cancer. So, if you look at the old writings of missionary physicians and stuff, what they find is that when you look at traditional societies that are eating a traditional diet and following a traditional lifestyle so they looked at places in Africa, for example, and compared that to the Europeans, they looked at the Inui in the far north, and they find that there's almost no cancer. In fact, Queen's University in Ontario used to send an Arctic expedition up every year to see why these people are immune to cancer. As they became sort of more westernized, that is eating bread and sugar and so on...

SHAWN STEVENSON: Cheetos.

DR. JASON FUNG: Yeah. As they sort of came into, away from their traditional foods, away from their traditional lifestyle, turns out they weren't immune at all. They got the same cancers as the rest of us and same within Africa. So in Africa, these missionary physicians would go and what they noticed is that the white Europeans would get colon cancer, the Africans following their own diet and traditional lifestyle almost never did. As those Africans became westernized and started following a Western diet, they got cancer. So they in fact called it one of the diseases of civilization, not a great term, obviously, but that's what they called it. This was back in the '60s.

So clearly what they found was that there's a huge environmental component where you live has a huge bearing and the foods you eat have a huge bearing. If you take a more recent example, you can look at Japan, which is a very sort of modern nation, and you can look at America, and the rates of cancer are strikingly different. So you can't say that one is civilized and one isn't, because both are civilized, but you move a Japanese person to America and the risk of cancer goes up, way up.

The risk of prostate cancer goes up, the risk of breast cancer goes up. So it wasn't about the genetics because it's the same Japanese genetics that moved over. It was something to do with our diet, and that was huge because if you go back to that, what we talked about earlier, which is that the attributable risk, tobacco is at 30%, but diet was right behind at 30%. So what we

need to know is not more about the genetics of cancer, what we need to know is what is it about our diet that is making us get cancer. Because that's the important thing that we can actually do something about.

And it turns out that there's been a huge amount of research in the last 20 years which has looked at this exact question, and it turns out that obesity is probably one of the major risk factors, type 2 diabetes... Again, one of the major risk factors, and it comes down probably to the high insulin levels. Insulin, we think of it as a metabolic agent, that is you give it... When you have type 1 diabetes, insulin is a hormone that goes up when you eat a lot of refined carbohydrates, for example, insulin spikes way up.

Turns out that it's a nutrient sensor, that is, it tells the body that nutrients are coming in, but it's a very highly potent growth factor. So, if you put the seed, which is that sort of cancer seed in the soil that is promoting, highly promoting growth, you are going to get the growth of those cancerous seed. If you take that cancerous seed and you put it in a soil where there's very low insulin, like there's just nothing to grow with, there's no growth factors, because that's the soil, that's the good soil is with lots of growth factors, if you put it in a body that has no growth factors, it's going to have a lot more trouble growing and your own intrinsic anti-cancer defenses would be able to take care of it.

And that's the whole point, we have to understand not only about the seed, but we've looked at the seed for so long, we have to understand the soil, and that's where obesity, type 2 diabetes is such a huge, huge, huge, huge, huge risk factor, and something that is actually completely within our control.

SHAWN STEVENSON: This is so remarkable because... So you just mentioned this with... If we're talking about the seed, we're really talking about the fact that, number one, these genetic mutations being the seed of cancer. The seed of cancer is really... I think we have a tendency to think that it's relegated to certain cells. We have the seed of cancer in every cell of our body...

DR. JASON FUNG: Yes.

SHAWN STEVENSON: And that's the big thing to kind of like as a paradigm shift. The seed is there in every cell of our body and it's not just uniquely human, this is across different species as well. The seed is there for cancer, for mutations, but the environment, the conditions are what... And so much of our paradigm has been focused on the seeds of cancer, while the soil and the conditions have largely been ignored. And you bringing up this issue around insulin, for example, and being a very powerful growth agent, this brings to light something. I've got to ask you about this. This is so, so interesting.

And one of the big drivers we think about with diabetes and obesity is sugar, and a big driver of insulin activity. And the connection between sugar and cancer, funny enough is commonly debunked, "debunked." And this is some of the most prestigious organizations claim that there's no connection but there is, and it's not hard to find. Just talk about a PET scan, for example.

DR. JASON FUNG: Yeah, it's... So Glucose is the sugar that we use, and a PET scan detects cancer by detecting how much a cell takes up that glucose. So cancer cells take up that glucose, which is sugar, far more rapidly than any other cell around it, so it lights up like a candle, it's like just this big blob, because you use radioactive labeled glucose and you see what cells are taking up that glucose. So you know that the cells love this stuff, just going to town on that glucose. So you know the cancers are feeding themselves with that glucose and yet people are saying, "Well, it makes no difference if you eat sugar, which causes insulin resistance, which then causes high insulin levels and so on." And it's one of these things where I find it very strange, because if there's a clear sort of path of physiology like the science is there, it's not like it's completely, "Oh, UFOs did it," sort of thing. It's like... It's not something...

SHAWN STEVENSON: Don't bring that up. Dr. Fung, don't bring up the UFOs right now. At this time, we're seeing all of these different things. It might be aliens, but anyways, go ahead, I'm sorry.

DR. JASON FUNG: It might be aliens. Yeah, they're right, with all the new Navy pictures. But you know what I mean, right? It's not like this random thing that somebody said, it's like there's clear evidence that there's something in our diet that has changed from traditional society to modern society that influences cancer rates. Sugar is one of the most common things that as you go from a traditional society, traditional diets are very low in sugar. And again, it's hard to comparison Inuit diet, where they're eating whale blubber and so on. But you can look at the Chinese diet of the '80s, for example, or the Japanese diet. They're very low in sugar, amongst other things.

So there's other things that are obviously different about their diet and our diet, but sugar is a very conspicuous one, because the western diet is typically much higher in sugar than those other traditional diets. The Chinese people, of course, in the '80s and '90s had extremely low levels of sugar, that they've been westernizing very quickly. You look at places like Shanghai and stuff, they're huge metropolises now, and their sugar consumption has gone way up too. And unfortunately, diabetes has gone way up. So they went from sort of a 1% rate of type 2 diabetes overall to 10-11%.

They're actually higher than the United States, which is scary because they have a huge number of people. So it was clearly not genetics because they change within the space of a generation. From the '80s to the 2020, that's one generation, and your rate of type 2 diabetes went up sort of like tenfold, that's a 1000% it went up. So clearly it's not a genetic thing, it's a dietary thing. And we know that if you have type 2 diabetes, if you have obesity, which also is mushrooming in China, then your risk of cancer goes way up.

In fact, there's 13 different types of cancer that the World Health Organization has deemed obesity-associated cancers, and these are some of the most important cancers that we have: Breast cancer, liver cancer, pancreatic cancer, colorectal cancer, like other than lung cancer, which actually has nothing to do with obesity, it's all about smoking. Those other cancers are the most important cancers that we have, and they're all obesity-related. All the top scientists say they're all obesity-related. So if they're obesity-related then sugar is going to play a key role, because everybody knows, eat a lot of sugar, you're more likely to gain weight. If you're more likely to gain weight, you're more likely to type 2 diabetes.

So it's like, I don't know why people even argue this kind of thing. The effects are going to take decades, cancer doesn't develop in a year. So people do these studies and it's like, "Oh, we did a year-long study and we didn't see any increased risk of cancer." It's like, "Well, that's because your timescale's all wrong." That's like saying, "We've determined that if you put metal in water, it doesn't rust, because we put metal in water and four days later, it didn't rust, so we've proved it." No, your timescale's all wrong.

Cancer takes decades and decades to develop, so you can't see the effect right away. You can see the effect sort of on sugar consumption for example, and obesity. We see that link very clearly. So, now there's a link between obesity and these other obesity-related cancers, so therefore the link between sugar and cancer is not really a big stretch of the imagination. They're two very clearly related things. So why people bother arguing I just don't understand.

SHAWN STEVENSON: It's crazy, like you just said, I think that that's a great understanding is that when we're looking at this in this very short-sighted perspective with sugar, for example, and not understand, it's kind of like a bamboo trees growth, there's so much happening, festering kind of below the surface before boom, you see this big manifestation, like with cancer, for example, now we can identify, but it's often many years in the making when we can actually identify it, and sugar is really...

It's in the same domain as asbestos right now, where it's taken all of this time and all of these years for it to be acknowledged as dangerous, and the thing is it's like it's the shift that's taking place in our culture just like asbestos, there was this shift, and we've identified that it led to this over a million percent increase in Mesothelioma for example, but with sugar in this

context, for folks to understand here in our culture, on average, depending on which database you look at, we're talking about the average American consuming 70-130 pounds of added sugars a year, that's added sugars, that's not even the naturally occurring sugars in all of the different products and bread products and grains and all those things.

It is an insane amount of sugar that our genes, if we're talking about genetic mutations have never associated with before throughout our evolution. And so again, we're having these really strange conversations about it when something is so, so blatantly obvious, but as you mentioned, and I love this about your book so much, you go through and you acknowledge repeatedly how science like this, it takes so long, you basically have to prove... Instead of you just already kind of coming into it like, prove that sugar doesn't cause cancer, that should be where the work is at. It's very twisted.

So I think if you could add a little bit more just for folks to wrap up today and wrap up these insights and just to provide a little bit more empowerment, we know that obesity is obviously a major, major component. You did some really great work, putting some data together in the book connecting obesity and cancer, very, very eye-opening, but what are some of the other things that we can do to help to modulate and create soil that is not conducive to cancer growth?

DR. JASON FUNG: Yeah, I think that this is where the big opportunity for research lies 'cause there's actually not a lot of research with it. So I talk very briefly about chemo prevention which is a term that was used starting in the '80s, and it's this idea that you can take something to prevent cancer. The truth is that after all these years, there's almost nothing that... And people have tried, if I take this vitamin or this vitamin or this vitamin, maybe I'll prevent cancer. In fact, almost nothing does, so maybe in type 2 diabetics, this drug called Metformin might and maybe green tea might. There's some data coming out of Japan where they drink a lot of green tea, where they say it prevents cancer, so that might be a chemo preventative agent.

But the rest of it, all the vitamins, all of the other natural supplements and this and that, there's actually no data whatsoever. But what's much more important is not what you're eating, it's what you're not eating. It's not that you need to eat more to prevent cancer, it's you need to eat less. And certain things are worse for you than others, eating less sugar is a big one, eating less refined food, eating less refined grains, because those are the foods, and we know this for sure. If you eat refined grains like muffins, which is made out of flour with a lot of sugar and other stuff, it's going to spike your insulin levels because of just the way it's made.

So, if you spike insulin levels and insulin is a growth factor, well, that's going to... Anything that promotes growth is going to be pro-cancer as well. So therefore, you want to avoid some of these things such as the sugar or the refined grains, and that's just based on knowledge,

because if you can prevent obesity... And we know that if you eat a lot of white bread and sugar, you're more likely to gain weight, that's... Most people have acknowledged that.

And the other thing that's very interesting is this ancient practice of fasting, because again, here's a practice which has been around for thousands of years, and what it does, of course, is it lowers all your growth factors because when you don't eat your nutrient sensors, which is insulin and also this molecule called mTOR, they're going to go down because you're not eating anything, so no nutrients are coming in, which sends the signal to the body that do not grow, because your body doesn't want to grow if there's no nutrients coming in. If you are sending this message to the body that says, do not grow, that is going to be a soil that is not conducive to the growth of cancer cells, and cancer grows faster than anything else.

So the point is that you can actually do these things such as eating unrefined foods, fasting, and these are the same things that you see in a lot of traditional societies as well as a lot of the societies that have low rates of cancer, like the 1980s China and 1980s Japan and so on, where they're eating a lot less of things, but they're also incorporating these ideas of fasting, they're not... People don't think you're crazy. It's just part of what you do over there. And people here talk about it too, like it's a cleanse, it's a detox, so it's not that...

We have it all wrong because we have this idea that we want to take something to prevent cancer, when in fact, you need to eliminate something to prevent cancer. And that's the more effective way to go, and it doesn't cost you any money because of course, you don't have to buy whatever they're selling. It's actually free. So these ideas of eating unrefined foods, cutting down the sugars, and fasting are probably the most important things if you want to do something about your risk of cancer today. And if you are able to lose weight, if you are able to reverse that type 2 diabetes, we know that obesity and type 2 diabetes are going to increase your risk of obesity-related cancers.

So if you move yourself away from there, by low carb diets, by eating unrefined foods, by fasting, you're very likely going to lower your risk of cancer. I don't know that for sure because the studies aren't done, but the problem is the timescale of those studies, that would take like a 15, 20 year study to do, by that time you can't implement it because that's so much later, but you can implement it today because those are all parts of what we've done traditionally. So I think those are great things to do to lower your own risk of cancer for these things. And it all comes back to not the sort of genetics of it, but the sort of environment, the sort of the soil part of things. That's what we need to focus on 'cause that's what we can do something about right now.

SHAWN STEVENSON: Right. It's so powerful. And again, this is one of those things where we should try to prove that fasting doesn't change the soil in a positive way, because it's kind of

obvious on the surface if we look at, like you mentioned, mTOR, autophagy, all those benefits, enhanced immune system performance in some context, which is another one of those hallmarks is the immune system not being able to take the cancer out. So just really creating a better environment for health to exist. Let's say that so a soil that's more conducive to health rather than cancer.

And so you talk about... You mentioned these tools, you've got a tremendous amount of work out there with the obesity code, the diabetes code, and now the new book right here, the cancer code. The most recent book, I know you've got something else up your sleeve coming soon. But this... And I shared this with you when we first connected that I feel this should be mandatory reading for the public at large, but truly, truly for folks who have cancer exposure in their life where either they are diagnosed with cancer, somebody they care about, to get an underlying education that is so often left out of the context that we exist in right now.

It's very much shrouded in mystery. It's so much experimental things without a lot of proof, and just giving people a new way of looking at things and feeling more empowered. So this book is incredible, and thank you so much for your brilliance and your time and energy going into something like this. And I know it's an adventure as well. Can you let folks know where they can pick up your book and also where they can connect with you and learn more?

DR. JASON FUNG: Yeah. So my books are available anywhere, so just check them out there. And you can also follow me on Twitter. My hashtag is @DrJasonFung. You can also go to my website at thefastingmethod.com and also check out my YouTube videos. Just look up my name, Dr. Jason Fung. And there's a lot there about weight loss, fasting, and that kind of thing, not so much on cancer yet, but I'm releasing videos sort of every week, so I'll get to it eventually.

SHAWN STEVENSON: Awesome. Well, I appreciate you truly so much for putting this work together and can't wait to see what you do next.

DR. JASON FUNG: Thanks so much, Shawn. It's great being here. Great to talk to you.

SHAWN STEVENSON: Awesome, Dr. Jason Fung everybody. Cancer is obviously one of the most pervasive issues in our culture today, but it's something that a lot of folks are battling, millions of people, without really understanding what it is. So today is really about demystifying what cancer is, some of its foundational principles, and also looking at what are some of the real world solutions? What are the things to look towards? And so our paradigm has been focused primarily on gene mutation. And it hasn't really borne out very good results.

And I love the analogy from Dr. Fung about looking at the soil and the conditions in which cancer can actually thrive. But some of those hallmarks of cancer that he covers in his book, we touched on a little bit here, but cancers has this really remarkable ability to resist cell death. Right? So all of our cells have this, it's known as the Hayflick Limit. They have a certain amount of times that the cell can replicate before it's a program cell death, apoptosis or cellular senescence, where this replication process is now ended. You've been let go from your duty and now it's time to move on, allow other new cells to come into play.

So cancer doesn't do that. It doesn't play by those rules. It just continues to replicate unchecked. So that's one of the hallmarks of cancer and what it does. Also cancer, like other cells, it needs a nutrient supply for it to grow. And this is another aspect or a hallmark of cancer, is it is able to induce angiogenesis. So that's the development, the connection to a nutrient supply. Right? So capillaries, blood vessels development. So that process allows cancer to grow to get nutrients, to get "energy" so that it can grow and develop. So that's another hallmark of cancer, which is its ability to gain its own nutrient supply, capture its own blood vessels so that it can grow. And again, the growth is unchecked.

Another hallmark of cancer is its ability to activate invasion and metastasis. So this is what's really dynamic and special about cancer, because our other cells don't show up in other places in our body. So you don't have tongue cells that show up in your glutes. That'd be just super weird anyways. The tongue butt. But cancer cells can show up and metastasize unchecked, go to different places in the body where they're not supposed to be, and that's another really special interesting thing about cancer.

And understanding these hallmarks, again, helps us to develop a level of empowerment so that we know what we're actually dealing with here, because in the domain of angiogenesis, for example, we know there's a ton of research around things that have anti-angiogenesis properties, whether it's through nutrition, whether it's through lifestyle practices, but things that we can do to, again, create the soil that is conducive to health and the healthy development of cells versus soil that is conducive to cancer. Right? So things that have anti-angiogenesis properties, right? And so also helping to reduce the ability for things to invade and metastasize and reducing the ability for cells to develop unchecked.

And a part of that is another hallmark of cancer addressing this piece. This is something we could proactively do, which is cancer's ability to evade immune system destruction. So the immune system is constantly scanning your physical matrix, your tissue matrix, the universe within your body, it's constantly scanning everything for rogue cells. It's one of the primary functions of the immune system is to identify abnormalities in cell replication and go and take those cells out. It has a myriad of different immune system weapons to do that, including your natural killer cells. We've got neutrophils. The list goes on and on.

So your immune system is hyper-intelligent in being able to take out abnormal cells and abnormal cell activity. So we want to make sure that our immune system is functioning as an immune system should. And today, we know there's a tremendous amount of data from all manner of different aspects of our lives that can suppress immune system function, from sleep deprivation, to abnormal nutrition, to nutrient deficiencies. So he mentioned earlier that we can't find that a specific nutrient, if we add this in, it's going to directly treat cancer or prevent cancer necessarily. That data doesn't exist.

We do have massive amounts of data indicating how specific nutrients help to regulate and fortify our overall immune system function. And so looking towards that, it's incredibly important because what we really want at the end of the day is an immune system that is well-versed in adaptation, right? So we have an innate immune system and an adaptive immune system. So being able to adapt to abnormal conditions because we live in abnormal conditions. The things we're exposed to today are so far removed from what our ancestors evolved in in those conditions.

The air we breathe is radically different. And pollution is one of those things, air pollution is on that list of known carcinogens, is a category one carcinogen, right? So even exhaust, engine exhaust, for example, all these things never exist before. Our exposure to radiation, just even in our environment, our exposure to things like asbestos. That was a good idea, let's just go ahead and line everybody's house in asbestos, and seeing a 1.5 million percent increase in cancer that targets our lungs. Right? It's crazy. And so we're still right now, we're tinkering with so many different things, is what humans do. We're tinkerers. We tinker.

So it's a altruistic incredible thing about humans that we want to learn, we want to expand, but once we get just a little bit of a nudge that this might not be conducive to human health, we got to have some checks and balances here. We got to be able to reel things back in. And instead of trying to prove that the thing is harming us, trying to prove that it doesn't harm us instead. So now we're playing with all these different types of waves, right? We got radio waves. We've got X-rays. We've got these different things going on with Wi-Fi and cell phones and all these things. Do we know the ramifications? Do we...

We know that all these things go right through the human body, they go right through our cells without any hesitation. There's nothing stopping it. We're existing, we're swimming in the sea of all these different things that we're tinkering with today. We don't know the ramifications. So what we do know is that we want to make sure that our immune system is able to do its job better than ever. And so this is one of the most important things moving forward. So really helping to fortify and support our immune system the very best that we can.

Again, we have a tremendous amount of data, how simple things can fortify and support our immune system and how not doing these things can dramatically suppress our immune system and increase our risk from all manner of infectious and chronic diseases like cancer. And one of those things being sleep deprivation, for example. Really great research coming out of the Mayo Clinic found that just a short stint of sleep deprivation dramatically increases our incidents of contracting a viral infection, right? So that's on the top of people's minds today, is the whole paradigm with viruses.

Well, little did we know that there are viruses that also contribute to cancer as well. And so the virus cascade that we are moving towards as humanity right now, is this going to be pro-cancer? Is that what we're going to see happen with some of the viruses that are imminent? This is... What we're experiencing right now is not the end. There's many other viruses to come. Just like, again, the seasonal flu virus, we thought we would stamp out influenza with the first vaccines back decades ago, 80 years ago. How has it worked out for us?

Still around. Taking our influenza, for example, upwards of 700,000 lives every year lost. And you barely hear a peep about it. It's still a really big issue, but what we should focus on is why don't more people get influenza? Why don't more people die from it? What are the things that their body is doing that's making them so resilient? Right. So sleep regulation support. Sleep hygiene is a term that's used, is really important in this paradigm. So obviously, there are a tremendous amount of things that we can do to support the quality of our sleep, not just the quantity. The quality of those sleep minutes matters most. Efficiently going through our sleep cycle is what it's really all about.

And obviously there are tremendous amount of things that we can do with our day-to-day lives, how we manage ourselves and our bodies in our... The circadian medicine... The circadian nutrition, the circadian existence, we really are a part of nature, and we have these nocturnal and diurnal patterns that is controlling when certain hormones and neurotransmitters are getting released, our digestion is all timed up to go on the circadian clock, so getting things in a rhythm with our circadian, kind of resetting and supporting our circadian timing system.

And so what I talked about in my book, 'Sleep Smarter,' was that a good night of sleep starts the moment you wake up in the morning. So one of the things that we know now in the data is that getting some early morning sun exposure helps to sync up our bodies cortisol rhythm, and one of the things that we see is that getting some high quality exposure to sunlight in the early part of the day helps us to sleep better at night. It also sets... On point, one of the things we get from sunlight that we don't really talk about is an improvement or optimization in our secretion of serotonin. Serotonin is well noted to be this kind of feel good neurotransmitters. We make it when we get some sunlight, it's free. It's free.

Alright, but serotonin, this isn't what's talked about very often is serotonin is a precursor to melatonin. Alright, serotonin is a precursor to melatonin, this glorified sleep hormone, but it's so much more than that, it's regulating our overall sleep cycle, sleep quality, totally free. So doing things throughout the day, movement matters, our exercise and movement, several studies, affirming that. Appalachian State University did a really wonderful study, finding that people who workout in the morning, morning exercisers tend to have more efficient sleep cycles and spend more time in the deepest, most anabolic stages of sleep.

Do you have to go balls to the wall in the morning, first thing, working out? No. Can you do five minutes or something? Do some super sets, do a little bit of tabata? Alright, that's 20 seconds of exercise, 10 seconds of rest, 20 seconds of exercise, 10 seconds of rest. Do that, it's going to get that cortisol rhythm on point, because what I would see in my clinical practice is what we would call people that are tired and wired when their cortisol rhythm was upside down as backwards.

And so cortisol is supposed to be high peaking in the early part of the morning and then gradually declining through the day, but we would see that flipped where people's cortisol was too low in the morning, making it very difficult for them to get out of bed, but then at night when they're just like, I'm going to get to bed, get a great night sleep, cortisol is high. And they're just like, I'm up, let's do some scrolling, let's do some YouTube surfing. And so helping to reset that cortisol rhythm, exercise in the morning, it's one of those very simple free things that we can do.

So, tremendous amount of viable clinical evidence that we have right now, also, there are wonderful things we can do with our nutrition. One of the things that I really love to do, 30-45 minutes before bed is have a cup of Reishi, so the renowned medicinal mushroom Reishi has a tremendous amount of peer-reviewed evidence on its benefits with improving sleep quality and also improving our immune system performance.

For example, the study published in the peer-reviewed journal Pharmacology Biochemistry & Behavior, found that the medicinal mushroom Reishi is able to improve sleep latency, so that means you fall asleep faster. It was also found to improve overall sleep time and improve sleep efficiency, so test subjects spend more time in the deepest, most anabolic stage of sleep, and also more time in REM sleep as well. It's one of those things... This journal that it's published in is focused on pharmacology, it's not trying to find things that are natural with little to no side effects to get benefits, but Reishi is that remarkable, that is in this peer-reviewed journal demonstrating this.

But also like I mentioned benefits with support in the immune system. For example, study published in the journal Mediators of Information, discovered that the polysaccharides found

in Reishi, are able to enhance the proliferation of your T cells and B cells, so these are your immune system weapons that are utilized to not only defend the body against pathogens, against cell mutations, but also to develop that cellular memory to get better at the job if we're talking about the B cells action.

So the only Reishi that I drink is from Four Sigmatic, but let me be clear, where you get your Reishi from matters immensely. How it's processed, matters immensely. You want a dual extraction of Reishi, which is a hot water extract and an alcohol extract, so you get all the beneficial compounds, because there are certain things that you can't get with a single extraction method, there's a category of triterpenes which have kind of these hormonal-related compounds, and they're these categories of antioxidants, betaglucans and things of that nature.

So if we're talking about in the context of the polysaccharides, how are you getting them? You need both, you need both extraction methods. The only Reishi that I drink is from Four Sigmatic, they do it the right way. It's sourced properly, organic, dual extracted. Simple, easy tea to have in the evening, a little chill out vibe, but they also have the Reishi combined with organic cacao, for example, like a nice little hot chocolate, and they also have Chaga for example which has some incredible benefits if we're talking about in relationship to the immune system. So definitely check them out.

It's foursigmatic.com/model. That's F-O-U-R-S-I-G-M-A-T-I-C dot com/model, and you get 10% off all of their incredible mushroom elixirs and blends as well, so definitely pop over there, check them out, you get at least 10% off, sometimes 15% off, 20% off, depending on how many of the different incredible mushroom blends that you get, so definitely check them out. But in this context of improving sleep wellness, this is just one domain. Our movement practices are also being shown to have tremendous effects on our resilience towards the development of cellular mutations. If we're not moving, our genes expect us to move. And today we are the most sedentary culture in the history of humanity, and it's only gotten progressively worse in the last year, year plus, with all the different changes to our society.

Now we've got several peer-reviewed studies showing how this behavior is very likely going to become more of a social norm, even more sedentary behavior, even more isolation. Humans, we are this really dynamic, powerful species, but we're very easily impressed upon by environmental changes, and so we've got to shift right now, we got to create a culture of health, create a culture of movement. And we've got a tremendous amount of resources here with The Model Health Show to keep you plugged in to what's good, what's sustainable, what's supportive of your greatness, and what's empowering.

So, definitely check out the recent episode with Katy Bowman, who's going to be a great resource on movement, movement practices, some of the science around that, and also, we've got a tremendous amount of resources when we're looking at more... If you want more information on cancer research, angiogenesis specifically, we've got some great episodes with Dr. William Li, out of Harvard, one of the great researchers in cancer, and also a really good friend that can be incredibly valuable as well, so many great resources and we're not stopping any time soon.

I appreciate you immensely for tuning into this show. If you got a lot of value out of this, please make sure to share it out with everybody that you care about, and as always, sharing is caring, and we're just going to keep this momentum rolling to usher in a change, a shift in wellness, because my goal, my mission, and I hope that you have the same, is to make health the norm where it's an abnormality today, to make being healthy, feeling good, feeling empowered, to make that the cultural norm. But we need to have an environmental shift, we also need to have shifts from within. I appreciate you so much for tuning into the show today, 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 could find transcriptions, videos for each episode, and if you 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 this 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.