



## DR. WILLIAM LI INTERVIEW Angiogenesis Expert

By Chris Wark

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## **DR. WILLIAM LI INTERVIEW**

### **Angiogenesis Expert**

Hey everybody, today I am interviewing the legendary Dr. William Li. Dr. Li is a renowned doctor, scientist, and anti-angiogenesis/angiogenesis expert. His groundbreaking work has impacted more than 70 diseases – including cancer, diabetes, blindness, heart disease, and obesity. Dr. Li’s wildly popular TED Talk “Can we eat to starve cancer” has garnered more than 11 million views. He’s been a guest on Dr. Oz, CNN, MSNBC. He’s been featured in *USA Today*, *Time Magazine*, *Wall Street Journal*, *The Atlantic*, *O Magazine*, and many more. Dr. Li founded Eat to Beat Cancer, which is a community of 60,000+ people who are passionate about using diet to fight cancer. Dr. Li has held faculty appointments at Harvard and Tufts University. And now I have the great pleasure of interviewing him and sharing his amazing, deep knowledge of anti-cancer nutrition with you.

Chris: Hello, Dr. Li.

Dr. Li: Hello, Chris.

Chris: How are you?

Dr. Li: I’m doing very well. Thank you for inviting me to join you. I am an admirer of your work and think that your message is really very important to the cancer community, both at the patient and also at the doctor level. So, thank you.

Chris: Thanks! That really means a lot to hear that. And I was kind of telling you this briefly before we started, but when I was diagnosed with cancer, I had just a handful of books. And I had no real access to nutritional science. It was in 2004; I don’t know if Pub Med was even around back then, but social media definitely wasn’t. And so, when I made radical changes to my diet and started overdosing on anti-cancer nutrition – which we’ll talk about the specifics of that – it was really just more instincts and a handful of survivor stories that I was following.

And then, years later, as I started blogging and when I decided to share my story and go public and try to be helpful to more people, that’s when I stumbled across you and realized, “Wow, this isn’t just luck. This isn’t just like hippie ideas. There is all this published nutritional science demonstrating that foods have all these amazing anti-cancer compounds and benefits to the body. And so, that got me really excited because it validated everything. I was like, “Now I’m starting to understand why all the fruits and vegetables I ate helped me recover.” So, thank you for your amazing research. I’m just so excited to dive in here. But that was my preface to this whole thing. So, a lot of scientific researchers are, it seems

to me, focused very heavily on drug development. They're focused on that side of chemistry.

Coming up, going through your education, and all that, how did you get turned on to nutrition?

Dr. Li: Well, my background is rather unusual. I grew up in a family where I had arts and sciences. My mother is a pianist. My father is a medical researcher. And so, I always began to appreciate the fact that science leads the way but doesn't give the full answer. And many times, when you hit the brick wall of knowledge, that you have to kind of get creative and look beyond the obvious or beyond what everybody believes is where we are, in terms of our current knowledge. And so, my own research has always been to look at common denominators. I've always been very interested in understanding what makes things the same, as opposed to in medicine we often are taught to look at what makes things different. And because of that, I came to this field called angiogenesis.

Angiogenesis is a Greek word that, basically, is very simple. It refers to how the body grows blood vessels, and we need all these blood vessels to feed every cell in our body. In fact, feeding our cells is a kind of nutrition. And angiogenesis is related to nutrition because what we eat actually feeds our cells through our blood vessels. Now that, I understood, became really important for your heart, for your brain, for developing your muscles – if you're young and exercising, or if you're old and you want to stay fit and have good tone. But I also realized, in my research, that this same common denominator of health and nutrition could have a dark side to it. And that dark side could come if cancers actually could hijack that defense system of nutrition and grow blood vessels selfishly to themselves.

And just to come back to the nutrition and how I got started, I started realizing that, first of all, there was this enormous opportunity to fight cancer by staving off the blood supply. So, that became one area of research. My work has been published in many very well-known medical journals like *Science* and *Nature*, and other journals like that. But I started to realize, as you had mentioned as well, that there was this hidden body, almost invisible body, of research that was being done all around the world. And these are articles done by serious scientists who are looking at plant-based foods, primarily, with the same eye, the same mind, the same tools that drug developers used to actually study chemicals that would ultimately be developed into drugs.

So, I started thinking, "Well, maybe there's a common denominator approach to studying foods, using the same tools as we use to study medicines." And so, again, this common denominator theme brought me over to the plant world. And I remember distinctly, in 1994, I happened upon a paper by a colleague of mine now, named Ted Phocis. He's an older guy now, but he's a really brilliant researcher from Greece. I was in

Helsinki and he did this research project, when he got to the lab, of studying the urine of villagers – both men and women from Japan – that ate a plant-based diet. These were farmers. And he was looking in the urine for any trace of natural chemicals that would come from plants. And he found this huge spike that became the focus of my attention, because that spike in the urine of the plant eaters was an anti-angiogenic, or blood vessel cutting-off, tumor-starving molecule that's not normally found in the human body. It's found in plants; specifically, in soybeans.

Chris: Wow.

Dr. Li: That opened my mind to this whole idea that we could actually begin looking at the treasures of Mother Nature found in foods that we eat, and begin taking a look at, not just the theory of what happens, but what really happens in people's bodies.

Chris: And I'll define it, for anybody that is not clear, because it's a very science-y word. Angiogenesis is the process by which your body produces blood vessels. And anti-angiogenesis blocks the formation of blood vessels, which, for a tumor, is a very good thing. And so, that's kind of what your research centers around: finding these compounds in specific foods that actually help your body block the formation of tumors. And so, my understanding – and please correct me if I'm wrong – is that a tumor can really not grow much bigger than the head of a pen or something – a very small size – without forming new blood vessels. Is that right?

Dr. Li: That's right. So, understanding the disease actually helps us understand how we might be able to prevent it and how we might be able to stave it off if we have it, no matter how you approach it. And the remarkable thing that we are learning about cancer is that the human body is made of trillions of cells that are continuously dividing. It's how we get bigger. And that's how we stay looking as vital as we are, and our organs are functioning – we have lots of cell divisions that are happening. And cancers form when there are mistakes that occur when cells divide. In fact, it turns out that there are mistakes that are being made all the time in the body – about 10,000 mistakes occur in our DNA every single day for healthy people, as well as people who are not healthy. And those little mistakes can lead to pinpoint cancers that can grow.

And once those pinpoint cancers grow, you're right in stating that they can get up to about two millimeters in diameter. That's about the size of the tip of a ballpoint pen. And then, they can't actually get any bigger by themselves because they don't have enough oxygen or nutrients. They are stuck. Imagine being on an island without food; you're probably not going to get any bigger or more vital. Your muscles aren't going to grow anymore if you don't get any more nutrition. And that's the size that they stay. And what we now know is that at that size, usually your immune system wings by, finds them, and just takes out those tiny microscopic

cancers. So, we all have cancers in our body forming all the time – children, healthy people, athletes, older people who don't have cancer. And what it is, is that they're microscopic and our immune systems, if properly defended, can actually wipe them out all by themselves.

Now, what happens is that occasionally some of these cancer cells get really smart and they can outwit the immune system. And then, on top of that, they begin making this protein – these are growth factors that are the same ones that our body uses to get their own nutrition with blood vessels. And they hijack those blood vessels to grow towards themselves. And once blood vessels hit a tiny microscopic cancer, our research has shown that the tumor can grow up to 16,000 times in volume, in only two weeks. So, it can explode in growth, if you have are feeding it. And that makes total sense. So, anti-angiogenesis is really trying to prevent tumors from growing their blood vessels. And if they've already been grown, which is what happens in most people who have already been diagnosed with cancer because the tumors are already big enough to be found, there's still an opportunity to starve that cancer – choke it up by cutting off its blood supply.

Chris: So, if a tiny tumor can grow, like you said, up to 16,000 times its size in a matter of a few weeks, does that change the way some people are looking at the progression of cancer growth? And what I mean by that is that a lot of times cancer patients are told, "Well, this has probably been growing in your body for 10 years." But I also know that people will have a mammogram one year and then the next year they may or may not have a mammogram, but they find a lump. And it seems like that thing popped up overnight. So, do you think cancers are growing faster than maybe people are told?

Dr. Li: There's little mini invisible cancers everywhere, and they just get taken care of. They're like pimples that form; and just like a pimple, they're not a big deal. However, they're cut off from a blood supply. And so, essentially your immune system wipes out all those little pimples. But once that one tiny little tumorous cancerous pimple can get a blood supply... So, let's say it's growing, growing quietly, quietly and visible. But once it gets angiogenesis, it'll actually be able to rocket off. And so, I think that that phenomenon that we hear about that it's been probably growing 10 years, you know, I don't know if it's really been 10 years. It may have been kind of coming and going and your immune system has been wiping them out. But at some point, the reason that we go from not having cancer to suddenly being diagnosed with cancer is usually a really steep, fast exponential growth; an explosive growth that brings it to our attention first, as people. I mean, sometimes doctors will go ahead and find, ahead of the curve, a cancer that's been lurking. But, oftentimes, somebody brings themselves to the doctor because they notice something that's not normal, and that's usually that big explosive growth that actually does it.

Chris: Yeah. So, it's possible that the cancer could be there for many years – microscopic and not growing at all. And then, something changes and then it quickly starts growing. That's really fascinating.

What do you think we're doing as a culture – let's say, as Americans – that is promoting cancer growth in our bodies, dietarily? And then, what are the dietary solutions?

Dr. Li: Yeah. Well, you know, that's a big question because we do know that we're starting to notice, in our own communities, that more and more people that seem to be diagnosed with cancer. And we're seeing, in some cases, evidence for increased rates of cancer. And while the mortality from many cancers seems to be plateauing – in some cases, declining a little bit – I think that our own human experience is that we seem to be seeing it everywhere. And that's, I think, what most people who are your listeners are going to be keeping in mind. And I always say, as a doctor, "Regardless of what the rate of cancers are – the statistics – if it's you, it's 100%." And so, that's what really matters, I think, to people who are paying attention.

So, you've asked another big question, which is what are the things that are happening in our culture that can encourage cancer growth? It's a couple of things. I mean, I think that we've become an industrialized society, and we're more and more exposed to toxins in our environment that are actually harmful to us. The biggest toxin that harms us – and is cancer-causing – is, in fact, solar radiation. When our greenhouse gases dissolve the ozone layer and the sun shines in our skin, it damages our skin, it mutates the DNA, it creates those little tiny microscopic cancers. And our immune systems have to work harder and harder to actually fight off those tiny little tumors. A recent paper actually showed that if you go out in the sun, let's say to a beach, and you then come inside and you think you're out of the sun, that actually the radiation from the sun is stored in your skin cells. And for three hours after you're indoors, it's releasing that energy and still causing damage. And so, just living on the planet.

But then, I think our society is making it more and more difficult. The toxins, the pollutants, the chemicals in the environment – they clearly create an assault on our defense systems. I know that there are many people who do exercise now, but I think by and large, there's a lot of people who are still not exercising regularly enough. And we know that a lack of exercise actually weakens your immune system. It actually helps you gain your weight; and obesity, actually, is another contributor to increased risk of cancer. Of course, so is smoking and alcohol. And even HPV, the human papilloma virus that you hear about, is actually starting to increase the risk of cervical cancer and cancers in the mouth and the throat. So, again, I'm looking just at the environment around us. We're in this toxic environment, in general, that is very hazardous to our health defenses. And that's gotten me really interested in better understanding

how our body normally defends itself. And how can we help stave off cancer more effectively? And that's where food comes in.

Chris: So, you're saying it's increasingly becoming more and more important that we boost our body's own natural defenses. Right?

Dr. Li: That's right.

Chris: That totally makes sense to me and is something I talk about all the time. It's interesting, one of the big news stories in the cancer community this week is the fact that apparently the EPA has been suppressing a report about how pervasively toxic and cancer-causing formaldehyde is. And they have this report that it's known, but they're not releasing it. And so, there's some controversy brewing about this report and why they won't put it out. And I guess insiders know what the report says, or whatever. But yeah, so many of the products we use contain formaldehyde – I mean, furniture fabrics, upholstery, varnishes, cleaning products. And it's linked to leukemia, lymphomas, and other cancers. It's really toxic. And again, that's just one of the many toxic things. But you reminded me of that.

Dr. Li: Right. I mean, I think the message that is being clearly appreciated is that we're surrounded by things that can provoke the growth of cancers in the body. And we need to do everything we can to boost our own shields. You know, our body's a fortress and just like any medieval fortress, there are lots of ways that have been developed over time to try to defend itself. Angiogenesis, which helps feed the cells of our body with nutrition actually has its own ways. The body can actually, by itself, stave off blood vessels from growing into tumors. But if you eat foods, you can boost that effect. But there are other defense systems, as well. For example, our immune systems are powerful ways of actually protecting ourselves against cancer because they're the ones that wipe out, clean off, and dispose of those microscopic cancers.

So, you've got angiogenesis; you've got our immune system. The microbiome – the healthy bacteria in our gut – we've now become to appreciate is super important in terms of communicating with our immune system and even our angiogenesis system. And so, our gut bacteria actually turns out to be one of our cancer defense systems. And if we feed our gut bacteria and make them happy, they can actually help to boost our defenses, as well. And then finally, of course, our DNA has to be protected. And then, what's really interesting is that stem cells in our bone marrow are also one of our defense mechanisms because we are regenerating healthy, non-cancerous tissue, all the time. And so, how we continuously nurture those health defenses is something that I'm working on now. And really, the take home is that it can start with food. We can build our defenses up. And it's easy because we can choose foods that are all around us. It's not rocket science, it's knowledge.

Chris: We've been dangling the carrot, so to speak. So, let's talk about the best anti-cancer foods.

Dr. Li: Right. I have a long list of cancer-fighting foods. Your listeners can find them easily on the Internet by coming to [EatToBeat.org](http://EatToBeat.org). It's a free site that you just sign up for, and it gets you right to all of this information that we've gathered over years on foods and the evidence that they can actually help fight cancer. But I wanted to tell you the ones that I think are standouts.

So, we've heard about green tea being healthy because tea contains antioxidants. Actually, tea contains hundreds of different natural molecules that are found in the tea plant. And most of these natural chemicals in the tea bush that grows are designed to protect the plant. There's the defense system for the plant. They help to resist insects from eating them. They help to attract bees to pollinate them. And when we brew and drink a cup of tea, those natural defensive chemicals for the plant have another job description. They start to defend our own cells. One of those natural molecules called EGCG, that you can find easily mentioned on the Internet, is actually anti-angiogenic. So, it actually cuts off the blood supply to tumors.

And so, you look at the scientific evidence, and then you correlate it to these large population studies. And that's really how we do it. It's not good enough that it works in a dish; it's not good enough if it works in a mouse. And that's really, oftentimes, where most cancer researchers stop their work. We take it to the next level to say, "In the public, in large populations, in the real world, in real people living real lives...is there any evidence that connects the intake of green tea, for example, with lowered risk of cancer?" And the answer is yes. Drinking anywhere from two to four cups a day of green tea, which is routinely done in Asia (and not big mugs, but small cups), can reduce the risk of colon cancer, breast cancer, liver cancer. They all have epidemiological evidence for having this benefit. So, tea is one of them.

Chris: I had green tea this morning!

Dr. Li: A couple of little tips about drinking tea that we've done our own research on, is that some people put dairy products in their tea – you know, the old English tradition of putting milk in your tea. That's not what you want to do, if you want to starve your cancer. Milk in a tea will actually precipitate, or bring the natural chemicals, down to the bottom of the cup. And so, then you're not getting the benefits. You want to actually drink tea straight.

And here's another little tip about tea. And again, I'm writing a book right now called *Eat to Beat Cancer: The New Science of How the Body Heals Itself*. It'll come out next spring. And if you sign up for [EatToBeat.org](http://EatToBeat.org), you'll be the first to hear about it. But we're actually including a lot of



little tips. So, for example, a lot of people drink tea at too hot a temperature. You boil the water, you pour the tea, you start sipping it right away. Drinking boiling hot tea is associated with an increased risk of some of the cancers of the esophagus. You want to let it cool down for about 10 minutes. That's about the right time. You steep the tea, the good stuff comes out, and then it's at a safer temperature to drink. So, again, it's not just simply picking the food, it's also knowing a little bit more about what to put into it or not to put it into it, and how to handle it before you actually eat it.

Chris: Do you have any opinion on matcha green tea versus just green tea leaves in a bag?

Dr. Li: Yeah, so it's very interesting. We have also done research to compare different teas. And matcha, which is a Japanese green tea, is very grassy. And some people really love it. Chinese tea is often tea that's rolled up and put into the bag. We actually found, in one research comparison study, that the Chinese tea was more powerful from a tumor starving perspective than the Japanese matcha tea.

Chris: Interesting.

Dr. Li: Here's the other surprise. We actually found that a black tea, which most people say doesn't have much value because it's been oxidized, turned out to be among the most powerful teas – more powerful than green tea. One, it comes to anti-angiogenesis. So, earl grey was actually quite powerful.

Chris: Wow.

Dr. Li: So, we can't make assumptions. We just need to be able to go out there and look at the data, which is something I'm really bullish about emphasizing. There is research, as you said. It's out there. I'm writing this book to give the public the data, but everybody should actually do the research themselves. And in your own podcast, what I love about it is that you go through the research and you try to explain it to people.

Chris: I do my best. I'm not a scientist, so believe me, it is hard brain work for me, not coming from a scientific education or background, to break down some of this stuff into language that anyone can understand. But that's really interesting about green tea and matcha. I've been consuming matcha for years and I guess I wrongly assumed, or maybe I read it somewhere or whatever, that because you're consuming the whole leaf, that maybe there's more benefits to that. So, yeah, that's really interesting.

Dr. Li: A couple of other foods that might be notable are tree nuts, like walnuts. We know that there are polyphenols that are found in tree nuts. And when you eat those polyphenols, they are anti-angiogenic and they get

into your bloodstream. And again, when you take a look at real human populations, you can find that the consumption of nuts lowers the risk of many different types of cancers – from prostate cancer, to colon cancer, to breast cancer. What’s really amazing is what we’re beginning to appreciate about nuts. It turns out that nuts are an incredible source of dietary fiber. When I went to medical school, we were just taught that fiber is good for making your bowel movements regular and helping to fight constipation. And that’s probably part of it. But, in fact, dietary fiber, like you would have in a tree nut, feeds your microbiome – the gut bacteria. They love fiber. And when the gut bacteria starts to digest that fiber, they metabolize it. They make metabolites that boost your immune system, that is cancer-fighting.

Last year, there was a pretty amazing study that was presented at the American Society for Clinical Oncology, which I know is a meeting that you cover from time to time. I don’t know if you heard about this study involving patients with colon cancer, but they found that patients that were undergoing regular treatment for colon cancer by the regular medical system, that if they ate two servings of nuts a week, they decreased their risk of death or recurrence by almost 50%. And so, here’s something that was just always in front of us that the doctors don’t tell you about, that researchers are doing. And now, the oncologists are running the actual research and finding out that there is a correlation between nuts and outcomes. And what I think is that this is partly due to the anti-angiogenic molecules that are substances that are in the nuts. But it is also due to the fact that we’re feeding our gut bacteria and they are helping our immune system fight off the cancer, as well.

Chris: I did see that study and got really excited about it. And I wrote up a little [blog post](#) summary about it last year. And you know, the thing about nuts is that you really do have to be deliberate about eating them. Because if we look at the Standard American Diet – if you look at pretty much any fast food restaurant or even a nicer sit down restaurant – by and large, nuts are not in the menu. They’re not in the breakfast options. They’re not in the lunch options. They’re not in the dinner options. Nuts are so rarely consumed in any American restaurant. We eat out a lot, and Americans are not eating nuts.

Dr. Li: Yeah. Well you’re bringing up another point. Going back to society, our bodies as humans evolved over tens of thousands of years from a much earlier stage of evolution of hunter/gatherers. So, our bodies evolved to actually perform by picking things that we could find on the ground or from shrubs and eating them. That’s how our organs actually evolved. Back in the hunter/gatherer days, humans really mostly ate whole plant foods, whole grains that they could find. They ate nuts, when they could find them. They ate very, very little animal protein. I mean, it was rare when you came across maybe a carcass or something, and then everybody descended and gorged. But then, it would be weeks and maybe months before you found something like that again.

What we've done over the course of human history – particularly, I think, in Western cultures, the Western diets – we've inverted everything where we have mostly animal protein and we have very little plant-based, fiber-based intake. And so, I think that's the explanation for this paucity, let's say; or a lack of nuts that we actually see. But that doesn't mean that we have the knowledge why we can't do it. I mean, you don't have to wait to sit in a lounge someplace for somebody to hand you a little thing of nuts. It's the easiest thing to go out to the store. And almost any grocery store will actually have a nut. If there's one packaged food that actually is good for you, it's going to be a bag of nuts.

Chris: Yeah. I love that you brought up the hunter/gatherer thing too because there's sort of this fantasy narrative that has been propagated that hunter/gatherers basically only ate bacon. They just ate meat all day, and then like a little bit of nuts and berries. But all of the studies on the few remaining hunter/gatherer populations on earth, like the Hadza for example, have revealed the opposite to be true, which is what you said. They actually subsist off of root vegetables and plant food and fruit. And they eat very little meat because they have to hunt it and kill it, and it's difficult. And the hunters in the tribes will go out for days at a time and often come back with nothing. And so, when they do come back, yes, everybody's excited and they eat it. And sometimes, it's just a little muskrat or something. It's not anything of significance; it's not enough to sustain you. So, yeah, the narrative's been twisted to justify this excessive amount of meat consumption because "our hunter/gatherer ancestors did it." And there's also the other assumption attached to that, which is that they had exceptional health and long life, which we don't have any evidence of either. But yeah, it's something that I'm constantly arguing and debating with people about.

Dr. Li: Well, I think that there is something very healthy, that the discussion's out to really challenge the way that we eat. That's probably the most important thing is that people are questioning the things that they may have grown up with, and asking if there's a different way. I think that that's a start to actually changing our behaviors, as a society.

Here's another food that actually you might be interested in. We all know the Mediterranean diet is actually very healthy, overall, for your heart, your brain, your weight. It lowers the risk of diabetes. And also, lower risks of some cancers are actually associated with particular ingredients that are found in Mediterranean foods. And one of them that I think is the most convincing is the tomato. So, what's interesting about the tomato is that it didn't start in the Mediterranean. Tomatoes were brought to the Mediterranean from South and Central America. They came from Peru. Potatoes came from Peru, as well.

Chris: Really? I did not know that.

Dr. Li: Yeah. So, there was no tomato sauce in Italy.

Chris: And it's such a staple now.

Dr. Li: Exactly. And in fact, when tomatoes were first brought to Italy, they were considered more ornamental, and they were rarely eaten. And I want to point out a myth that's occurred about tomatoes and nightshade and poison and all kinds of stuff that was also in the literature. When tomatoes were first brought to Italy, they were placed onto lead trays. And the acid in the tomato would leach out the lead. And when people ate tomatoes, they would actually get sick – literally lead poisoning. And that led to this idea that maybe tomatoes were toxic.

And so, the wealthier people who could afford tomatoes had them as ornaments, they just put them as nice little decorations around the house. But, of course, the peasants who couldn't afford fancy silverware, flatware, and plates just kept them out in the sun on wooden shelves and window sills, which is how farmers do it and how you're supposed to actually store tomatoes. And it's really the rural peasants that began developing, in the Mediterranean culture, the idea of tomato sauces.

But here's what's amazing. Tomatoes actually contain a natural bioactive chemical called lycopene. Now, most people have heard of lycopene because you can buy lycopene supplements. It turns out that lycopene is a powerful anti-angiogenic molecule. So, it actually starves cancers by cutting off the blood supply.

How do we know that that actually works in people? Well, there is a really famous large epidemiological study conducted out of Harvard called [The Health Professionals Follow-Up Study](#). It's about 70,000 men followed over 20 years. And when they looked in that population and saw what they ate and correlated their outcomes, they found that eating tomatoes was associated with a reduced risk of prostate cancer. In fact, men that ate two to three servings of cooked tomatoes a week, each serving being about a half a cup of tomato sauce – so, easily putting that on your pasta or whatever – would decrease their risk of prostate cancer by about 40%. So, now, in the men that did get prostate cancer, they also looked at their actual cancers because they could look at them under the microscope. And they found that in those men who ate more tomato sauce per week, the prostate cancer under the microscope was less aggressive and had fewer blood vessels feeding the cancer. So, that's almost a smoking gun that connects the tomatoes with decreased risk. And the more tomatoes you ate, the less aggressive the cancer was and you saw fewer blood vessels.

So, I think for men that are concerned about prostate cancer, there is really strong evidence that tomatoes can actually reduce the risk. But it's got to be cooked tomatoes. And why does it have to be cooked?

Chris: I think I know why. So, I had read at some point – picked up this tidbit – that cooking tomatoes increases the lycopene by maybe six or eight times

or something. Or it changes the absorption of lycopene. Or maybe it changes the molecule. Am I close?

Dr. Li: All of the above. You chose to answer “E,” which is all of the above. It turns out that if you eat most tomatoes off a vine, they’re delicious, a great source of vitamins and other phytonutrients, but the lycopene that occurs in Mother Nature is very difficult for your body to absorb. In fact, most of it passes right through. But if you actually heat the tomato, the heating of the tomato – the simmering – will actually change the chemical structure into a form that your body loves to absorb. So, it increases the absorption of the lycopene. And lycopene is what we call a fat soluble, or it can dissolve in fat substance. So, if you heat tomato sauce with some olive oil, it helps your stomach absorb it even better. So, Mediterranean diet, tomato sauce simmered with olive oil, it starts to make a little more sense. And this is where the science and the culture kind of collides together, converges together. And it helps us understand why eating tomatoes and having tomato sauce might be beneficial.

Chris: What about ketchup though?

Dr. Li: Well, okay, so I think that homemade ketchup is probably just fine. In general, processed foods are the ones that we need to be careful about because we don’t know how they’re made. I think that, as somebody who is very careful about what I eat and I care a lot about trying to prevent cancer in my body, it’s all about making good choices. And when you have the choice of knowing where your food came from and how it was prepared versus not knowing, I go for the knowledge of where it came from and how it was prepared every single time.

So, these are three good foods that I think are top: green tea, nuts, and tomatoes. There’s a long list of other ones, as well.

Chris: What about cruciferous vegetables?

Dr. Li: Well, okay, so cruciferous vegetables, which are your green, crunchy vegetables – like broccoli and cabbage – are all phenomenal because they contain natural molecules, as well. It’s almost zoology, kind of like going out and finding out and discovering all these different molecules and putting them in the right classification. But there are sulforaphanes. So, that’s what makes Brussel sprouts and cabbage smell and have that strong taste; it’s kind of a sulfury smell. That’s a natural molecule. That is a biochemical that Mother Nature put in the plant that actually is anti-angiogenic, as well. So, when you eat broccoli, cabbage, chicory, kale, and those kinds of cruciferous vegetables, you wind up actually consuming the sulforaphanes.

Now, one thing, again, about technique. God is in the details often. When you eat vegetables and you chew the plant – if you were to eat a head of broccoli or a broccoli floret, and just crunch it a couple of times and

swallow it – actually, most of the benefit is still stuck in the fiber of the plant and it will pass through you. If you chew the plant, what happens is that you will burst the plant cell. So, if you keep on chewing, like how our moms used to tell us to chew our food, your saliva and the crunching of the actual plant cells will release those sulforaphanes. And so, you remove them from the inside of the plant, and now when you swallow it goes right into your bloodstream. So, again, it's not just eating the plant, it's actually how you chew it, as well, that can actually make a difference.

Chris: And chewing causes that enzyme reaction, right?

Dr. Li: Exactly. Yeah. You know a lot about this.

Chris: I'm pretty geeky. I'm pretty geeky about this stuff. I also read some research that, obviously chewing is very important with cruciferous vegetables because it creates sulforaphane. But also that you can chop them and let them sit for 10-15 minutes before cooking – because cooking reduces the potency of some of these anti-cancer compounds – but if you chop them up first, let it sit while you're doing some other food prep, and then cook, it preserves the sulforaphane.

Dr. Li: That's right. What you're doing is you're actually releasing those sulforaphanes out, making them more concentrated and more available for your body. So, that's absolutely correct. So, most of the foods that we associate with good health, that are plant-based, have reasons that we're beginning to unravel and discover of how they actually can hit the targets that we want to help prevent, or even treat, cancer. And I think that if any of your listeners are actually people who are struggling with cancer, one thing I know is that...

You asked how I got into this. I was a VA doctor once, and I felt very strongly that my service to the people who serve our country was a big responsibility. I felt that we could do better care for the people who were committed, themselves, to helping us. And when I saw these people, they were in their fifties and sixties and seventies, and they were terribly overweight, out of shape. They had terrible diseases – heart disease, diabetes, cancer. And yet, something that always struck me when I hung up my white coat and left the office everyday was that when they were 20 years old, they were cut and buff. They were in the best physical shape our country had, which isn't why we had them as our armed forces. And so, something that always bugged me was wondering what happened between people that were in total shape and people that wind up totally coming out of shape. I think the same thing is true when you look at professional athletes. If you look at football players, they are in such great shape during the season, but then, fast forward 20 years and their body changes.

And so, it made me realize that, in addition to genetics and other things, their diet probably contributed a lot. And as their doctor, I was

examining them and too often handing them a diagnosis of a disease that nobody wants to hear about. They would ask me, “How long do I have?” and “What do I get treated with?” and “How bad is it?” And I would tell them, and then they would be on their way out the door and every single one of them, without fail, would turn around at the very end and say, “Hey, doc. One more question. What can I do for myself? What can I eat?” And I realized I didn’t have the answer. I was never taught that in medical school or training. And so, I realized that was something that I really wanted to pursue, and that led me on this journey that I have right now, which is all about trying to understand better what foods actually can be helpful to us. Do I have an answer that I can give to people who are struggling with a disease like cancer? And is there the evidence of science that makes it real and not wishful thinking?

Chris: Well, nearly every doctor is getting those food questions, especially in the cancer community. And the tragedy – I hear this over and over and over – is that oncologists are telling cancer patients, “Go home and eat whatever you want. You really need to eat high calorie foods, like ice cream and milkshakes and pizza, because we’re worried. We don’t want you to lose too much weight during chemo. So, eat this high calorie, complete junk food.” And yeah, they basically give them permission to go home and just continue eating a horrible Western diet – the diet that contributed to their disease, in a lot of cases. Working at the VA, I’m sure you saw the hospital food there. I’m sure it was deplorable. And you may not know this about my story, but I had colon resection surgery. And the first meal they served me after cutting out a third of my large intestine was a sloppy joe.

Dr. Li: Oh, boy.

Chris: Speaking of the VA, right? Pretty much the only place you can get a sloppy joe is if you’re in the army, right? Or in prison.

Dr. Li: Well, look, I mean, here’s something positive that I’m starting to see, even within the medical community, we are beginning. I think it’s just beginning. But we are starting to have this conversation among doctors. When I was in medical school, believe it or not, I had a hard time believing doctors were still smoking. They were talking about lung cancer to their patients and then going out and having a smoke in the parking lot. It was ridiculous. Fast forward 25 years, and now we’re beginning to see doctors are, themselves, beginning to look in the mirror and ask, “What am I doing to myself?” It’s hard to preach what you don’t practice. And so, one of the things that I’m very committed to doing is trying to educate doctors and have them rethink everything that we’ve known about diet, which is why I’m writing this book, to hopefully try to get the message out.

And your podcast is a wonderful medium, as well, and I’d love to help you continue to get your word out, as well. But this idea that we should

be thinking deliberately, consciously about how we live our lives and diet plays a really, really central role. We don't want to go for wishful thinking, we want to go for evidence. We want to look for the science, the data, the same way that we would for any type of intervention that could be helpful to us. And so, I think that we're slowly starting to change the mindset of the medical community. We've got a long ways to go. But I think that we will get there.

I was part of a conference that I helped to convene last year in Paris, that you might be interested in. It was called Rethinking Cancer. And it was prompted by a colleague, a friend and an advisor of mine, a guy named JJ Trochon, whose story is well known because he's been in the media before. But he's an airplane pilot who was diagnosed with kidney cancer 14 years ago. And he used diet to completely overcome his disease and because he used anti-angiogenic foods, as well. Many years later, he approached me and he said, "Hey Dr. Li, I would love to be able to help bring the patient's view of things that we have questions on, but that doctors don't address. I'd like to bring that into a medical conference. Could we just create a new medical conference?" So, we created this. He's from France; that's why we had it in France. We call it Rethinking Cancer.

And I've collaborated with a colleague of mine named Dr. Bernard Escudier, who was also a very openminded oncologist. And we said, "Let's create a cancer research meeting. And the only rule for this meeting is that you can't talk about chemotherapy or radiation or surgery." So, you remove all those topics from a cancer research meeting and what are you left with? You're left with diet, you're left with psychosocial, you're left with sleep, you're left with stress, you're left with a lot of these things that we all have questions about. But we brought the world's best researchers to the table.

And one of the things that I wanted to share with your readers that I think will be really interesting is that, as you know, immune therapy is widely touted as one of the big breakthrough areas. And some of them actually work really well. Like President Jimmy Carter had a melanoma that had spread to his brain and he was able to get an immune therapy, which melted his tumor away. Well, the therapy didn't melt his tumor away, his immune system was able to attack it. I was also fortunate. My own mother had a cancer and her body was able to respond to immune therapies, as well. But actually, many people who are treated this way don't respond.

And so, it's one of the big dilemmas. How do you know who's going to respond, and how can we make people respond better? Because obviously, ideally, we don't want to use medicines to treat cancers. We want our bodies to treat the cancer. That would be the ideal thing.



Well, there was a presentation that was given at the Rethinking Cancer meeting, Dr. Laurence Zitvogel, who works at the Institute Gustave Roussy. He looked at patients who were receiving immune therapies and found that the difference between the people who responded, whose immune system was able to wipe out the cancer or shrink the cancer, versus the people for whom it didn't work, was based on the presence of one gut bacteria. And that bacteria, they could find it in the stool, is a bacteria called akkermansia. If you had this bacteria in your gut, in your colon, you actually would respond. And if you didn't have it, most of the people who didn't respond, didn't actually have it. It turns out you can't eat that bacteria as a probiotic. The only way you can get that is by eating foods that can actually help to nurture the growth of that bacteria naturally.

So, another food that calls to mind is pomegranate juice. It turns out that the ellagitannins, the natural tart substances that are present in pomegranate, actually feeds the bacteria – that akkermansia – that actually helps prompt your immune system to fight cancer. Cranberries can also do the same thing. So, again, this is new research that's coming out, that was only published a few months ago, that is changing the way we think within the main mainstream medical community. It is opening our eyes that the things that we used to, that doctors used to, poopoo away, we have to really take seriously.

So, again, think about the patients who get antibiotics as a matter of course during their cancer treatment. That might be wiping out some really valuable bacteria that's helping our bodies. Or chemotherapy, itself, actually lowers our immune system. What can we do to push back against that? How can we right the scales in our body so our immune system can be as fortified as possible? It turns out that eating some foods can do that.

Chris: You brought up so many things I want to touch on. One of the most, I think, under-appreciated side effects of chemotherapy is the destruction that it causes in the digestive tract, in the intestinal tract, and that it wipes out so many good bacteria. And that's so important. It's not talked about enough. I'm so glad you brought it up. My mind is kind of blown about the pomegranate thing and that specific bacteria that improves immunotherapy treatments. I mean, that is so amazing. *(Sarcastically.)* I thought for sure you were going to say it was Pepsi.

Are you going to do the conference again?

Dr. Li: Yes. We're planning to do the conference. There's a couple of conferences that we're going to plan to do, as well. And so, it's all in the planning stages. You'll be the first to know when we get it together.

Chris: Oh, I'd love to know, I'd love to know about it. And I remember hearing about the Rethinking Cancer thing. It came across my desk or whatever

and I looked at it and thought, “Wow, that looks pretty interesting.” And now I’m kind of kicking myself because I should have dug a little deeper and just gone. Next time!

Yeah, that’s great. I said this a minute ago and I didn’t actually finish the point I wanted to make, which was that so many doctors obviously are asked about nutrition by their patients. And they don’t have any answers. And they just shrug their shoulders. And they either give them, what I would say is bad advice, or they just shrug their shoulders and say, “I don’t know,” which is where you were years ago. And it’s just so commendable that you are the kind of person who was not okay with not knowing, and was not okay with just saying, “I don’t know. Next.” And you went on a quest to find answers.

And there’s only a small contingent of medical professionals that have the same mindset as you, that have either walked away from conventional treatment or just said, “Hey, there’s so much more that we can do to help patients.” Diet and lifestyle medicine is huge. It’s the missing piece here, even if a patient is getting conventional treatment. And I do agree with you, and it is nice to see that things are changing. Like there’s a large association of plant-based MDs now, more than ever. Diet and lifestyle medicine is just growing and growing every year. Even some hospitals are starting to serve organic food, and have salad bars. I mean, they probably still have the hot bar with the meatloaf and whatever. But it’s encouraging and exciting to see improvements coming and things changing.

And I think a lot of it is driven by public demand. The public’s being more educated on nutrition. And doctors are part of the public. And so, they’re seeing this stuff, too, in their off hours. Right? And the practice what you preach thing is such a key component, I think, because it’s like you said, the doctor who smokes and is telling people, “Well, you know, you have lung cancer.” There’s a phrase I coined that I think is one of the most pervasive problems in medicine and in the health and wellness community, and it is what I call the meat lovers bias. And so, the doctor or physician or practitioner or even wellness influencer that loves to eat meat three times a day is not interested in looking at studies, for the most part, that show that meat consumption leads to a lot of diseases, in excess.

Dr. Li: Right. Well, you know, this is the whole thing about looking at data, the bias of interpretation. And so, I would say that there are so many research studies that have been published and are still underway looking at the benefits of food. That’s what I call the signal – looking at the data. But there’s really a lot of noise out there because even well intentioned people trying to interpret the data can come at it from their own perspective. And then things get confusing. So, one of the things that I think that you and I share is this commitment to really try to make sure

the signal rings true and is really more easily seen. And hopefully people will start to focus on signal and kind of ignore the noise.

Chris: Yeah. And it doesn't help the fact that there's so many industry-published studies. There's so many studies that are published with intention to protect industry interests, like the tobacco companies publishing studies saying that cigarettes didn't cause cancer, decades ago. And Big Ag and the Big Meat industries and things constantly publishing studies, trying to make claims about how everyone needs to eat beef every day, or whatever.

Dr. Li: Well, my view is this. The data doesn't lie, it tells the truth. There's an old saying that was used in a lecture for my medical school graduation that was themed, "In God we trust; all others bring data." And I think that that's really how we should be able to look at all the studies concerning cancer research and the role of diet: "Let's look at the study. Let's look at how it was designed. Let's look at the results. And let's look at how it was interpreted." Because if we have enough minds looking at it, I think truth tends to reveal itself. And that's where we need to go. And I think we're beginning to find new truths about our food, and our food supply, and our food systems, and the decisions that we make, and how we educate our families about the foods that we eat. And going back to this whole idea of culture, I think that we're at this moment of time in society where we're starting to question what we're doing. And I think the next phase we're going to move into is trying to figure out what do we do about it?

Chris: Yeah. You mentioned epidemiology earlier, and the value of looking at large populations of people and looking at their rates of disease, and the way they're living their life, and what they're eating. And, obviously, green tea was a significant factor, but there's another one in Asian countries, too. They tend to consume a lot more mushrooms, right? Talk about mushrooms.

Dr. Li: Well, so, mushrooms are really interesting because first of all, if you prepare the mushrooms the right way, they're tasty. And there are so many different types of mushrooms that are out there in America. We tend to be stuck with just a couple of mushrooms – white button mushrooms – which, by the way, are also very valuable. They build our immune system. So, white button mushrooms are actually quite a good mushroom to have. We also have looked at mushrooms. Mushrooms contain a natural bioactive molecule called beta-glucan. Beta-glucan actually stimulates your immune system, and it is also anti-angiogenic. So, now you have two benefits wrapped up in one. And it turns out that the beta-glucan is distributed all throughout the mushroom. And there's a lot of dietary fiber in a mushroom, as well. We usually eat the top of the mushroom, right? And when you buy mushrooms, you cut off the bottoms and throw that away and just cook the tops. It turns out that the stipe, or the stem, of the mushroom is where a lot of the goodies are.

And so, as we do this research, we start to realize that maybe there's even a sustainability, better for the planet thing. Let's not waste our food. Maybe we should be eating those mushroom stems. They could actually bring some benefit. So, mushrooms are an incredible way of actually getting a soluble fiber, it helps feed your microbiome, getting beta-glucan, builds your immune system, and is anti-angiogenic. And the mushrooms that we tend to find in the grocery store, we automatically recognize the white button mushrooms. But I think that if you go online and just look up edible mushrooms and then go to the store, you'll realize that, in fact, there are some other mushrooms out there – like shiitake mushrooms and portabella mushrooms. It's a treasure trove of tasty morsels that you can find. I'm a big fan of encouraging people to eat mushrooms.

Chris: That's great. And I eat a ton of mushrooms every day. I don't know how much you know about my dietary strategy. But it was very simple and I ate the same thing every day, which was giant salads for lunch and dinner. And it was broccoli, cauliflower, kale, cabbage, red onions, peppers, mushrooms, a little sauerkraut, a little olive oil, apple cider vinegar, some sprouted legumes (different varieties), and broccoli sprouts. I mean, I was just piling it on, right? It was like the anti-angiogenic super salad.

Dr. Li: Right. Well, I mean, that was a choice you made based on knowledge you had, and it was a really good set of choices. And so, that's what I encourage everybody to do. We all make choices every day in our lives to do the right thing and help ourselves, and not hurt ourselves. When you're crossing the street, you look to the left and the right before just running out there. Same thing with choosing your food. Think about what you could do and think about what you should do, and make the right choice.

Chris: Well, Dr. Li, this has been so fun. I want to be respectful of your time and just thank you for carving out an hour to chat with me and share your wisdom and expertise. It's been a real treat.

Dr. Li: A real pleasure for me to speak with you, as well. And I wish you continued success in everything you're doing.

Chris: Thank you so much. And listen, everybody, I want to encourage you to connect with Dr. Li. [EatToBeat.org](http://EatToBeat.org) is his site; it's a community site with loads of information and science on anti-cancer nutrition. It will be very valuable to you. We'll put links and show notes to some of the studies that he and I talked, about so you can look those up and read them and learn. And then, hopefully, we'll find out about the next conference or conferences that are coming up and I can share those with my audience as well, as those details come together.

But anyway, thanks for watching everybody. Please like this video. Please share it. There are people in your life that need to hear this. They need to understand that your choices matter, that what you put into your body every day can actually produce health or disease. And it's up to you.

Thanks again, Dr. Li.

Dr. Li: Thank you.

Chris: Bye, everybody.

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