Introduction and Guest Background

– Welcome back to this episode of the Reverse Inflammaging Summit Body and Mind Longevity, Medicine. And I'm your host, Dr. Robert Lufkin, metabolism, longevity, and processed junk foods are all interrelated.

And today we're going to be talking to a world authority on the subject, Dr. Robert Lustig, he is a emeritus professor from the University of San Francisco.

And he's written numerous books in this area including metabolic A, which is his most recent one. I highly recommend it, but it's so great to have you on the program, Rob.

Thanks for joining us. – It's my pleasure. I just want to know one thing. How come you come in front of me alphabetically in the from the medical director? – That's right where our names are very, very similar there. Well, I'm so excited about all the stuff we're talking about today. But before we get into it, maybe you could just take a moment and tell us a little bit about how you, how your journey, how you got interested in this particular area.

– So, first of all, thank you for having me. 2nd of all, I am a pediatric neuro endocrinologist. So I study how the brain controls hormones and how hormones control the brain.

Now, when I entered this field, the excitement was in sex differentiation. While boys were boys and girls were girls from the neck up and also from a clinical standpoint, the excitement was in growth hormone because growth hormone had just been approved by the FDA for treatment of growth hormone deficiency. And so that's what I thought I was going to do for my career. I had, you know, minimal interest in the obesity metabolism, diabetes, chronic disease field.

In fact, I went into pediatrics to stay out of chronic disease. And of course, you know, that's all I do. Funny how those things happen.

How Obesity Became an Endocrine Disease

Obesity was of course, not an endocrine disease, except of course, it was, You know, for all those years, but in 1990, for, we discovered this hormone called Leptin and leptin, which is a hormone that your fat cells make, which travels through the bloodstream to the brain, to tell your brain that you have enough energy on board to burn properly, to engage in normal expensive metabolic processes such as puberty and pregnancy that basically regulate the rate of energy expenditure.

So when that hormone was discovered, it became very clear that obesity was an endocrine disease and it just so happens that when that happened, I was a physician working at ST Jude Children's Research Hospital in Memphis Tennessee, the pediatric cancer hospital. And so I had a cadre of about 40 Children who had survived their brain tumors.

And of course, they had multiple different endocrine problems because of the tumor or the surgery of the radiation. But one of the problems that was very glaring, very prevalent and very debilitating was that these kids were gaining weight, hand over fist nonstop, even though they weren't eating very much, they were gaining weight at the rate of about a kilo a month.

And so these kids were now 350 400 lb, you know, when they were perfectly normal prior to their tumor, and the parents would complain to me, this is double jeopardy.

My child survived the tumor only to succumb to a complication of the therapy. And so it was my charge, you know, to try to do something for them. Well, because I'm a neuro endocrinologist. I knew about a literature in, you know, the basic sciences where uh investigators had taken electrolytic lesions, you know, electrodes and put them into

the hypothalamus of rats and buzzed and these animals would then eat like there was no tomorrow and gain enormous amounts of weight.

And we called this phenomenon hypothalamic obesity because of the hypothalamic damage. And I rightly at that point assumed that these kids had the same problem as the rats. It's just that they got it because of their tumor, not because of an electrolytic lesion. And I also rightly assumed that the reason was because they couldn't see their leptin.

So it was up to me to try to figure out what to do for them. Well, I can't fix a brain and I couldn't stop, you know, the weight gain, you know, by trying to influence the brain. So I had to think, well, what's downstream of that lesion? And we knew from the rat data that if you cut the vagus nerve, which is a nerve that goes from the brain to the pancreas.

If you cut that vagus nerve, you can stop that weight gain. So it appeared that the brain was thinking it was starving because of that damage. And that the brain was telling the pancreas release more insulin in order to drive more energy into fat in order to try to increase the leptin.

But of course, you would never see the leptin because the brain was broken. So I thought, well, I can't, I'm not a surgeon. I can't cut a vagus nerve.

But what I could do is give these kids a medicine that would suppress insulin release at the level of the pancreas. And we had a drug that was available to us called Victory A Tide, which was normally used to treat growth hormone, secreting tumors of the pituitary, but it also suppressed insulin as well.

And so we did an open label trial of eight kids, giving them this medicine to see whether or not it would have any effect. And lo and behold, you know, beyond my wildest dreams, you know, of the eight patients that we treated in an open label fashion, they all got better.

Four of them lost a lot of weight, four of them at least stabilized their weight. But something even more important happened. These kids started exercising spontaneously.

These were kids who sat on the couch, ate Doritos and slept and now they were physically active. One kid became a competitive swimmer, two kids started lifting weights at home. One kid became the manager of his high school basketball team running around collecting all the basketball.

I mean, these kids who had checked out a life, these were kids who the parents would say, you know, my kids gone, even though he's here, he's gone because he doesn't do anything. He's a lump on a log.

And now they're saying I got my kid back and the kid would say this is the first time my head hasn't been in the clouds since the tumor. So this was really, really remarkable because it suggested that the medicine changed their behavior.

So what we did was we did a double blind placebo controlled trial using the medicine versus placebo. And this time we built a quality of life questionnaire into the protocol.

And we found that when we got the insulin down with the medicine, these patients felt better and these patients started exercising. And so what this showed me, you know, very clearly was the biochemistry comes first that the behaviors that we associate with obesity, gluttony and sloth are actually secondary to the biochemistry rather than primary.

And so everybody has been saying, eat less exercise more, it turns out no, get the insulin down. And when you do, you will eat less and exercise more of your own volition.

And so I turned my obesity program at UCSF into an insulin reduction program, get the insulin down and we were enormously successful, You know, and to this day, you know, that's how our clinic practices.

And that's one of the reasons why, you know, we're going on 20 years now. So I'm very clear on why I do what I do and it was the data that brung me, you know, I, I didn't have a vested interest or, you know, an agenda going in, you know, basically I followed the data.

– Yeah you are really a leader in um looking at the effects of processed food and junk food if you will on metabolism and health and the far reaching effects it has on the health care industry and, and really the world at large. Maybe before we look at the components of it.

But how do you define what is junk food? Everyone probably agrees. We shouldn't eat junk food. But what is it about food that makes it junk or processed?

What Makes Junk Food Harmful

What are the key things to look out for? – Right. So in order to make the jump from what I, you know, I just described to junk food. Let's make it very clear that virtually everyone who is obese has an insulin problem. Insulin dynamics are defective in. Virtually everyone who is obese.

Insulin is the driver of weight gain insulin shunts energy to fat. Insulin makes fat, more insulin, more fat. Now, these kids, they have high insulin because of their, you know, hypothalamic damage.

Why does everyone else have high insulin? And that's where junk food comes in. So the question is, what about junk food leads to high insulin? And the answer is the liver is the downstream target of the pancreas. The pancreas releases insulin and it goes immediately to the liver via the portal vein.

And when the liver doesn't do its job, the pancreas knows that and releases more in an attempt to make the liver do its job. It's a negative feedback pathway.

So when your liver is sick, your pancreas over works okay. And that increase in insulin then floods the entire system all over the body. And that's what drives the wake in. And it's also what drives the chronic disease.

So you have to get the liver healthy, you have to make the liver insulin sensitive so that the liver will respond to the insulin signal properly. So what is it about junk food that causes the liver not to work?

Right. And the answer is two things. The first is the sugar because it turns out that one molecule of sugar called fructose. As you know, sugar, dietary sugar, sucrose, table, sugar, cane sugar. Beet sugar is two molecules.

One's called glucose. One's called fructose. Glucose is the energy of life. Every cell on the planet burns glucose for energy. Glucose is so goddamn important that if you don't consume it, your body makes it, you have to have glucose in your blood or you will die, but you don't have to consume it.

You don't have to eat it because it's so important. Your body can turn fat into glucose, it can turn protein into glucose. It has multiple methods for being able to keep your glucose levels up.

That's how important it is. So people who don't consume glucose, people on a say ketogenic diet or the Inuit, whether in Delhi or the toque allowed tribes who basically, you know, consume only milk and meat and no uh carbohydrate still have a serum glucose level because their livers will turn fat or protein into glucose.

So you don't have to eat it, but you have to have it in your blood fructose. On the other hand, this other molecule, the sweet molecule, the molecule that makes candy and cakes and ice cream and breakfast cereal and everything else, you know, sweet and addictive, okay. That molecule turns out to be completely unnecessary to all animal life on this planet. There is absolutely no biochemical reaction in any animal cell in any species on the planet that requires fructose. It is completely irrelevant to all animals, especially humans.

Now, we just so happened to like it a lot. It just so happens that it is addictive because it stimulates the reward center in our brain the same way. Cocaine, heroin, nicotine alcohol do.

But it is completely unnecessary. Well, it turns out that fructose when it reaches the liver causes your mitochondria, the little energy burning factories inside each of yourselves to become dysfunctional, they don't work.

And when they don't work, your liver can't burn the glucose. And what happens is it turns all of the carbohydrate into fat. This is a process called de novo like a genesis new fat making turning carbohydrates, especially sugar into fat.

And this is why everyone today now has fatty liver disease. And when you have fat in your liver, your liver doesn't work, right. And when your liver doesn't work, right, your pancreas makes extra insulin.

And when your pancreas makes extra insulin, guess what you got? Obesity and chronic disease. So, ultra processed food is bad because of too much sugar.

But that's only one reason. The second reason ultra processed food is bad is because ultra processed food has no fiber and fiber turns out is essential.

It's just not essential for you. It's essential for the bacteria in your intestine. So each of us has 10 trillion cells in our bodies, but we have 100 trillion bacteria in our intestines are intestinal bacteria outnumber us 10-1. Okay. Well, they got to eat something.

Well, what do they eat? Well, they eat what you eat. The question is how much did you get? But versus how much did they get? And what they like to eat is fiber. They will eat the fiber.

You can't digest the fiber because you don't have the enzymes in your intestine to do it. And the reason you don't is because the fibers for them. So when you consume your food with fiber, you are feeding your microbiome.

And when you feed your microbiome, your microbiome leaves you alone because they're happy. When you don't feed your microbiome, your microbiome gets mad because they don't have anything to eat.

So what do they do? They eat the meuse in layer right off your intestinal epithelial cells which then expose your intestine to all of the junk in your intestine, which then causes systemic inflammation.

And since we are talking about inflammation in this podcast, uh this is one of the primary drivers of inflammation. And when you have inflammation, then that's another reason why your insulin doesn't work well. And so now you have another reason why your liver is dysfunctional because of what happened in your intestine because you didn't feed your bacteria.

So ultra processed food is bad because of the sugar which causes mitochondrial dysfunction and the lack of fiber which causes systemic inflammation. – And let me emphasize one of the go back and emphasize one other point that this, this insulin resistance that you mentioned before, before we get into the sugar and the details there. But this insulin resistance, it's not something just in, in the young Children, you are seeing that are obese or even even adults who are obese. In fact, insulin resistance occurs with aging and the arguably the majority of the US population has a degree of insulin resistance.

They have elevated H A one season. They may not have crossed over into the prediabetic range. But with aging, there's a general tendency towards increased insulin resistance and inflammation as a function of aging.

Insulin Resistance and the Western Diet

– A recent paper from Tufts argued that 93% of the American population is insulin resistant, has metabolic dysfunction on the basis of insulin resistance.

A previous paper said 88% you know, if you want to make it 88% 93% point is virtually everyone in America is suffering from this. And the reason is because virtually every one in America is eating the western diet and it is the western diet, the high sugar, low fiber diet that is driving this metabolic dysfunction – And let me push back a little

bit on fructose.

Some people say, well, fructose is part of fruit, it's healthy, it's is an apple off a tree and ultra processed food. It contains fructose. What is the nuance there?

– So it is true that an apple does contain fructose. That is true. Not that much. I mean, if you take an apple, the amount of fructose in there is about a total of about five g.

Yeah, the amount of fiber in that apple Is a whole lot more. It's on the order of about 10 g. Well, that fiber actually prevents the absorption of the fructose in the intestine the soluble and insoluble fiber in the apple. And this is true for virtually every real food food that came out of the ground will have both soluble and insoluble fiber.

They are not the same soluble fiber like pectin zor in your like what holds jelly together and insoluble fibers like cellulose like the stringy stuff and celery, they're both fiber okay. They have different functions.

They work together, they're synergistic and so the apple has both. And what will happen is the insoluble fiber. The cellulose will act like a fishnet, a latticework on the inside of your intestine. The soluble fiber are globular.

They will plug the holes in the fishnet and together they will form an a secondary barrier, a gel, a whitish gel that you can actually see on electron microscopy.

And what that will do is it will serve as a secondary barrier, preventing the absorption of glucose, fructose, sucrose, simple starches from the gut into the bloodstream.

And so yes, when you consume the apple, yes, you're consuming sugar. Yes, you're consuming fructose. That's true. But that fructose is not for you because it never gets absorbed by you.

It rather goes further down the intestine where the microbiome will chew it up for its own purposes because the fiber made it. So, so when you eat the apple, it's not a problem.

Fruit vs Fruit Juice

On the other hand, when you process that apple and turn it into apple juice and you have removed the fiber and now you can't set up that gel. Now you will absorb it and now it does become a problem. So, in fact, when you look at the meta analyses, the statistical analyses of fruit versus diabetes, it turns out that the higher the fruit consumption, the more you are protected from diabetes, whereas the higher the fruit juice consumption, the more likely you are to get diabetes because it's not the fruit, it's the fiber that matters.

– So an orange off a tree is, is healthy, but that glass of orange juice is processed junk food. – Exactly. Right. – So the effect of this processed junk food, largely fructose is this metabolic regulation, insulin resistance inflammation that we've, seen and heard other speakers talk about increasing the risk for obesity, diabetes, heart disease, stroke, cancer, for Alzheimer's disease.

One interesting speaker we've had, who, who is Chris Palmer, who's written about now, metabolic dysfunction and mental health. And that's, it's some very fascinating work. I'd like to look instead of all the way to mental illness.

What do you think about the effects of metabolic dis regulation on sort of the normal person. You know, there's that famous study with sugar drinks and violence and all and, and kids and it was just a correlative study.

But what do you think is going on with not people who are schizophrenic or, or, you know, have clinical mental illness, but instead it's someone dealing with their boss at work or their spouse or their kids or making political decisions and, you know, running the world government, what is the effect of this junk food on normal people and the mental state of how people get along with each other?

– So I believe, and I know that Chris Palmer believes this as well. In fact, I gave Chris a a blurb for his book, which

by the way is right here, it's called Brain Energy and I recommend it highly, you know, you're gonna read two books, read mine and this one.

But what Dr. Palmer espouses and I believe as well is that metabolic health and mental health are the same thing. And the reason is because of mitochondrial dysfunction in the brain.

So you can have mitochondrial dysfunction in the liver, which I've already described, you can have mitochondrial dysfunction in the brain. Now, it was always assumed that fructose doesn't get into the brain.

Oh, yes, it does. It absolutely does. It doesn't get into neurons, it gets into astrocytes. Gets into the glial cells gets into the cells that nourish the neurons instead.

And what it does is it causes changes in neurotransmitter synthesis. So, there are two neurotransmitters in the brain. They do opposite things.

Metabolic Dysfunction and Mental Health

One is called glutamate and the other one's called Gaba gamma, amino butyric acid glutamate is excitatory. Gaba is inhibitory, turns out glutamate becomes gaba glutamate is turned into gaba.

There's two enzymes, the glutamate is acted on by an enzyme called glutamine synthesis, which turns the glutamate into glutamine. And then there's a second one called glue glue tannic acid.

The car box Alice which turns the glutamine into Gaba turns out fructose inhibits that glutamine synthesis. And so what you end up with is a imbalance in neurotransmitters between the excitatory and inhibitory, which then have effects on cognition, effects on irritability and emotion have effects on behavior.

All sorts of things that are Documenta Ble, a colleague of mine, Dr. Bill Wilson, who is a very astute clinician in Lowell Massachusetts has written a book called Brain Drain and in it, he describes 22 symptoms that he put together from pattern recognition over 40 years, which he calls carbohydrate associated reversible brain syndrome. Carb syndrome, C A R B syndrome.

How appropriate and you know, things like brain fog, you know, like, you know, forgetfulness, you know, an ability to access short term memory, etcetera. Things that people ascribe to, you know, bad day lack of sleep, poor energy, blah, blah, blah.

The bottom line is they're all fixable, they're all reversible. When you take the carbohydrate out of people's diets, they will get better. So, carbohydrate associated reversible brain syndrome.

Now, is it because of these changes in neurotransmitters? Maybe? Is it because of the myocardial dysfunction itself? Maybe? Is it because of changes in trophic factors in the brain?

Like for instance, brain derived neurotrophic factor or BDNF or leptin maybe is it because of changes in the microbiome which then send messages from the gut to the brain via the Afrin vagus nerve. Maybe there are a lot of different ways that will go on in the body and what go on in the diet could ultimately affect cognitive function and also emotional distress.

And we haven't yet figured out what causes what. But we do know that diet is really, really important that we do know and we do know that when you get the ultra processed food out of your diet, you feel a whole lot better, not just not just physically and metabolically, but in fact, cognitively, behaviorally and you know, above the neck.

It has now been shown that ultra processed food consumption correlates with dementia. It has been shown that ultra processed food correlates with addiction.

It's been shown that ultra processed food correlates with depression. So those are correlative diseases. We still

need causation. I agree we're not there yet, but there's every reason to believe that mitochondria in your liver are very much like mitochondria in your brain in terms of how they work. And so we know how fructose affects mitochondria in the liver. It's very, very likely that it does similar problems, similar things in the brain.

– When I started in this space, I was very naive. I'm still very naive. But when I was naive about, I thought that there was a lot of information such as the information you're telling us now about how harmful these, these substances are and processed food.

And I was under the, what I believe is the misconception that if I just educate the people, if we just get the message out there that so many people would benefit.

And I have like friends who are, who are professionals, healthcare professionals, highly educated people, and they understand the damage that sugar causes.

And one person just recently got diagnosed with known heart disease on their CT scan. And they've heard all the, the stories about about sugar and I, they'll sit down to breakfast and have a glass of orange juice in the cereal. What?

It's not enough to educate people? Is it or what, is the problem with? What's the problem beyond just education here? What else needs to be done? – Education alone has not solved any substance of abuse.

Did Nancy Reagan's just say no work. We have an opioid crisis. We have a fentaNYL crisis. Okay. The fact of the matter is that, that's why it's addictive. You can know cognitively that whatever it is you're addicted to it can be cocaine, heroin, nicotine, alcohol, sugar or gambling, social media, internet gaming, shopping, pornography, you can know that whatever it is you're addicted to chemicals or behaviors, they are ruining your life, your health, your community, your economy, your family and you are powerless to do anything about it.

That's why they're addictive. That's the definition. So education alone is not enough. And the reason is because when you over release dopamine and that's what happens in the reward system and dopamine is released and gives you a feeling of reward. Okay.

This feels good. I want more. Okay. But dopamine just like glutamate is an excitatory neurotransmitter. It excites the next neuron. Now, neurons like to be excited. That's why they have receptors.

But neurons like to be tickled, not bludgeoned whether it's glutamate or dopamine. You know, they like a quick burst and they then they like it to go away and they like to recover from it. Okay.

Why Education Alone Is Not Enough

Chronic overstimulation of any neuron anywhere in the body doesn't matter where chronic overstimulation of any neuron will lead to neuronal cell death.

Now, neurons don't want to die. They have a plan B. They have a secondary defense mechanism. What they do is they down regulate the number of receptors.

So dopamine gets released, then the dopamine receptor goes down more. Dopamine gets released, more dopamine receptors go down. And so you end up needing a bigger and bigger hit to get a lower and lower response.

Until finally you need a huge hit to get nothing. And that phenomenon is called tolerance. And everyone who's ever experienced addiction knows about tolerance.

You need more and more to get less and less the law of diminishing returns. But when those neurons actually do start to die, they don't come back, they're gone forever.

Neurons don't divide. They are post differentiation. So you lose a neuron, it's forever, you lose a dopamine neuron, it's forever. And that means that even if you got over your addiction, you're not going to get those dopamine neurons back, which means that your ability to perceive reward and pleasure will forever be attenuated because you'll never be able to get the same reward response.

Well, that is why people go back and relapse. That is why people, they're trying to recapitulate that original high and they can't do it. And sometimes they overdose.

And that's why so many you know, former drug addicts when they go back to using end up, you know, in the morgue because they, you know, tried to, you know, regenerate the same level of dopamine activity that they had previously. And they can't because those neurons are dead.

So this phenomenon is very real, it goes on, you know, uh in a good 20-25% of the American adult population. And what people don't understand is that, you know, we have sugar addicts.

Okay. If you say, oh I have a horrible sweet tooth, you're a sugar addict until proven. Otherwise, the problem is that because sugar is in everything. You can't even go cold turkey.

So you constantly have that craving, you constantly have that need, you constantly have that draw and so you can't cut back. So this is, you know, a problem of the food industry, not just of individual patients.

– I mean, how do we get to the point where processed food addiction is so common that if somebody gives up processed food, they're considered to be an outlier on some sort of weird diet or something and – Well, that's a different issue. You know, what I can say is that, the first people to do anything differently are always thought to be crazy outliers and, you know, over the course of time it becomes, you know, common practice. You know, we have seen this, you know, you know, numerous times. A lot of it happens here in California.

Of course, we become the laboratory, you know, for, for the rest of the country. But the fact is, you know, this is a movement that people now do understand and are starting to get on board with. And the food industry is recognizing that they have a problem and, you know, what are they going to do about?

It is still open to question, but they have seen the data and I can prove it, I can prove that the public is being educated Because in 2011, the International Food Information Council I think, which is a pr arm of the food industry. Every year.

They do a survey of public survey. They ask a question. In 2011, they asked a question, what food stuff or what ingredient causes weight gain. And back then, only 11% of the population said refined carbohydrate or sugar.

Virtually, everyone said a calorie is a calorie or I don't know. They asked the same question again seven years later in 2018 and now 33% of the public said refined carbohydrate and sugar.

And it all came from the group that set a calorie is a calorie or I don't know. So we have the data to show that the public is being educated, whether that will ultimately translate into food industry action.

That is yet the, the jury's still out on that. – What else needs to be done? I mean, should we have laws restricting sale of sugar containing products, those effective or what do you in a perfect world?

What would you like to see – In a perfect world? You know, if I had a magic wand, you know, everybody asked me, you know, if you could like do one thing, you know, and have it stick and have it durable you know, like, what would it be if you were like, head of the U S D A for a day? You know, what would you put into place?

What I would do is I would get rid of all food subsidies, all food subsidies, all of them, not some of them, all of them. And the reason is because they distort the market, right?

Policy Solutions and Food Subsidies

And so when you subsidize corn, wheat, soy sugar, which are the things that are currently being subsidized. Okay, what you're doing is first of all, you're making everything else more expensive because you're providing the subsidy for these things and all these things are the things that kill you.

And number two, you're destroying the market to make it cheaper so that people will consume more of the things that kill you. So if you got rid of the subsidies, okay, then, you know, the price of individual foodstuffs would, you know, not be, you know, would, would basically find their own rational market.

Even the libertarians, you know, can get on board with this. And it turns out that, you know, people say, well, then the price of food would go up actually not.

So the gene, any foundation at UC Berkeley did this exercise several years ago and found that in fact, the price of food would not change except for two items, corn and sugar, which is exactly what we would want to go up in order to reduce total consumption. So for me, that's where it starts, that's what I would do.

Now, there are other things we can do. For instance, At UCSF here in, in San Francisco in 2015, we instituted for all of our campuses, you know, throughout the entire bay area, what we call the healthy beverage initiative.

You cannot find a sugared soda Anywhere at UCSF. You cannot buy one no vendor, no cafeteria, no, nothing. Okay. If you want to drink a sugar soda, you have to bring it from home.

I mean, we don't have police running around, you know, spying on people. But you know, so if you want, if you want to drink a sugar soda, then you bring it from home.

But you can't buy it on campus because we are a medical campus and we're trying to model for the public what you know, rational consumption should be, you know, where was smoking first? Band hospitals for good reason.

Right. So what we did was we studied it when we put this into practice in 2015, we studied it and it turned out that our employees improve their insulin sensitivity and reduce their waist circumference because we took it off campus so they could drink it when they went home.

But what we found was that their total soda consumption was cut in half because they couldn't buy it at work. There's an example of something you could do And so in fact that process is now being implemented at all U C s across all of California.

So that is going on right now. So there's an example of something we could do. So there are things that could be done. In addition, we are working to try to establish a an upper limit of added sugar in children's meals at school because there's no reason for excess sugar being delivered to our Children while they're, you know, under someone else's roof.

So there there are different things that could be done and we are doing them. – Those are great. I have to ask one more question and that is for our audience. I mean, your message is very strong and I'm sure there are people out there thinking well, I'm going to avoid sugar.

I'm gonna cut out that I'm switching to Diet Coke. I'm going to use artificial sweeteners. I'm going to be healthy. Now, what's your response to that? – Thank you for asking.

Yeah, everyone thinks that diet sodas are the answer. What we now know is the toxicity of one Coca Cola equals the toxicity of two diet Coca Cola's half as bad, half as bad does not mean good.

It means half as bad. Now, why no fructose, no calories should be great, right? Well, not so much. Remember that microbiome turns out diet sweeteners alter the microbiome in different ways that ultimately lead to increased systemic inflammation and glucose intolerance. This has now been shown in several different studies both in animals and in humans and also turns out sweet when sweet touches the tongue, you get an insulin response.

Anyway, the brain interprets sweet as sugar, whether it was sugar or not. And so you still get an insulin response and if you get insulin response, you're still going to gain weight.

So it turns out that diet sweeteners are not the panacea.

Diet Soda, Artificial Sweeteners, and Closing Thoughts

Unfortunately, they may have a role because if your sugar addict, it may be a way to wean you off like methadone for heroin addiction. There might be a value to it but not as a substitute as a tool, maybe as a substitute. No.

So yes, unfortunately, what we really need to do is de sweeten our lives And you know, the food industry obviously is fighting tooth and nail against that because this is their juggernaut. This is their gravy train.

This is what this is how they went from a 1% annual profit margin to a 5% annual profit margin. This is how they get us to eat all their, their junk. You know, is sugar is the hook.

So we still have a lot of work to do. – There's no drug that will block sugar, I guess a car bows block sugar absorption, but – With great side effects. – Right, right to the point where you don't want to eat sugar anymore. – You don't want to eat ever again anymore.

A car bows does reduce sugar absorption, carbohydrate absorption, glucose absorption. But at a great cost in terms of G I distress, you know, most people do not want to take that. – Yeah. Yeah.

Rob, this has been great. How can people find out, how can people follow you on social media? And also maybe you could tell us, tell our audience your website if they want to find out more information from you.

– So I'm easy to find. Everyone seems to my web addresses, robertlustig.com. Easy enough. I'm on Facebook and Instagram and linkedin and for the moment, I'm on Twitter, but we had this discussion just before we went on air.

We'll see what happens with Ellen. Okay. And if Ellen stays head of Twitter, I'll be off. So watch this space as Rachel Maddow says, – Thank you so much, Rob for spending this time with us and, sharing your, your wisdom with our, with our audience.

And also thank you so much for the great work you're doing in, in this space and making people aware of the problem that we're really facing here. – First of all, Dr. Lufkin, thank you very much for doing this as a public service and you know, we do need to get the message out. So I appreciate, you know, the opportunity and I appreciate what you're doing.

Ultimately this problem will get solved. All cultural tectonic shifts take a generation. We've had four cultural tectonic shifts in the last 30 years.

Bicycle helmets and seatbelts, smoking in public places, drunk driving condoms and bathrooms. 30 years ago, if a legislator stood up in a state house or Congress or Parliament or the Duma or anywhere else in the world and proposed any legislation around any four of those things that have gotten laughed right out of town.

Nanny state liberty interest. Get out of my kitchen, get out of my bathroom, get out of my car today. They're all facts of life. No one's belly aching about any of those.

We have new things to belly ache about like vaccines, right? But no one's belly aching about those four. So how did we fix that? How did that happen? Answer?

We taught the Children, the Children grew up and they voted and the naysayers are dead. That's why this is a generational shift. But you have to start with education, you have to teach the public first and that is why I'm very happy to be here discussing this with you. And hopefully some of your listeners will take some of these messages away and we think their own thoughts on the problem.