Ivor:	00:42	And we're on. Hey Gabor Erdosi, great to see you again.
Gabor:	00:46	Yeah, Ivor. It's a pleasure to talk to you again.
Ivor:	00:49	Yeah, it always is. So, Master of Microbiology but mainly your experience has come from a huge amount of personal research and your experience with starch processing and many other things. But, I was going to start off with just having you retell your story about your autoimmune and other conditions that were quite severe and significant in your life and how you actually went about finding out the biochemistry, the pathology of what was happening, and actually resolving it.
Gabor:	01:25	In fact, I usually call myself a “Sofa Researcher.” That's what I do. I'm reading on my iPad usually different kind of stuffs which have some interest.
	01:40	Well, it's been more than five years now. It just started out as kind of a health journey with my mother telling me that, “Son, you are really overweight. You should do something. You have a family, you have to take care of your kids and you are into this in the long run.” “You have something like 30 kilos extra, and that's not healthy.” Yeah, I just realized that over the years, I had picked up something like 30,32 kilos. That's around 70 pounds for the US folks.
	02:20	And I was training in biology, molecular biology formally, but I had no clue at that time how to lose weight. So that was just a weight loss journey. At that time, I had absolutely no clue that I was dealing with autoimmune disease. I had these lower back pains popping up regularly, and I had no clue. I just thought that I inherited this lower back pain; both my parents have it. Yeah, this is how life is; I have no clue. Then I went on this weight loss journey. I’ve started reading about a lot of different things, mainly weight loss and the how to lose weight and be as your diets in general and then the deregulation of weight, these kind of things. And a couple of years, something like two years, two and a half years into this long after I lost all the extra weight, I had another flare up of these lower back pain and I went to the rheumatologist or whatever it's called in English to get an opinion and I got a genetic test, some x rays and other diagnostics and the genetic tests came back positive for a HLA you know, this immune patterns on the surface of cells positive for one of the these which is typical for a disease called ankylosing spondylitis (arthritis). It’s kind of an autoimmune disease.

04:17 After that I went into reading a lot of stuff about it and it turned out that it has (as most autoimmune diseases) it is connected to kind of an imbalance within your gut. So it's kind of a dis- biopsies of different bacterial strains, which means that you have more of the kind of bad type and less of the more beneficial types of bacteria in your gut, mainly in your small intestines. And it is especially associated with a bacterial strain called Klebsiella and it turned out that this guy Klebsiella leaves on high starch diets and it expresses an enzyme which can specifically trigger the immune system due to a similarity kind of a molecular mimicry, which means that the very similar amino acid sequence for the protein which is called a the pullulanase enzyme which breakdowns the branches in starch.

05:26 So, as starch debranching enzyme, which is extremely similar, the one part is extremely similar to the human collagen (the connective tissue.) And, the end result is that your immune system faulty recognizes some of your collagen molecules as not indigenous, not part of the inner system but as an invader, as it was coming from this bacterial world or outside of the bacteria. The end result is that you get this inflammation in your joints, in your connective tissues which starts running into bones and basically calcification stars.

06:17 First you have it in your spine, but if it spreads, it can go to your ribcage and then even into your eyes, gasification in your eyes. And not surprisingly, it's also associated with several fold higher risk of getting arteriosclerosis, I mean calcification of your arteries. So, yeah, I was a little bit horrified what to do. I mean, I was already on a kind of a low carb Paleo diet, but I was not on a extremely low starch diet. I decided to eliminate basically all starch from my diet, so I kept eating some vegetables and some non-starchy fruits. And surprise, surprise! After a couple of months, I was back to kind of normal, and ever since I have been maintaining the stage. I've never went back to the rheumatologist.

07:20 At that time, I had to take some drugs, some non-steroidal anti-inflammatory drugs and I had to go to do some special workouts for my back. And, you could literally hear these calcified joints breaking up. So, it was a little bit scary. But after a while… and one thing I can really remember at that time, one of my daughters in a bedroom had a what is it called? This is a two story bed, and I had to throw up the blanket every evening. That was kind of a ritual when saying goodnight that I took care of her blanket, shake it and then I had to throw it up to this, like two meters high. That's something like six feet whatever. And it was a big problem for me. I couldn't really do that. After a while,

		I just recognized that I was able again to do it without any pain and then just moving freely. So it seems that this autoimmune disease and actually since then, I've recognized that most autoimmune diseases start in your gut with some kind of an increased permeability. So more and more bacterial parts make it to your bloodstream or into your lymphatics and these trigger these autoimmune reactions within your body. Basically, I'm managing it with a little bit of workout, especially taking care of my back, but mainly, lifestyle and many diet. I'm usually on a zero-starch diet, but if I eat something with starch from time to time it's okay but I have to be careful not to eat these things consecutively. I mean if you eat continuously starchy things and these change back the bacteria composition in the digestive system, and then I tried it and that it starts on this slippery slope again.
Ivor:	09:40	Right, Gabor. Great summary! And, if I just parse out a bit then, so what you eat has a very significant impact on the nature of the bacteria in your intestines and in this case, the bacterial components find their way into your system, trigger your immune system they appear to the immune system similar to your own body's collagen, and therefore your immune system misfires and attacks your own collagen, as you described the calcification and many serious (implications).
Gabor:	10:12	Yes.
Ivor:	10:13	Yeah. So the thing is as well that what you did there by root-causing a problem, analyzing it, finding the solution and deploying the solution, if you had not done that, the reality is you'd probably be facing lifetime medications to varying degrees and to varying amounts. But you'd essentially become a lifetime patient trying to manage or mitigate this disease rather than fixing the cause. And I think this is so huge because most of our modern chronic diseases and we get into more mechanisms in a minute, they're mostly driven, I would say, by the substrate on the material we put in our mouth. I mean, sure, we can inhale problematic compounds, but overwhelmingly they're driven through myriad different mechanisms by what goes in your mouth. This is not really acknowledged by modern medicine though and I think that that's where the huge gap is.
Gabor:	11:11	Yeah, I think the analogy that what goes into your mouth is extremely important. But at the same time, it's not only your mouth. I mean, we can discuss all kinds of barriers on your body because the basic barriers against the environment are… I

		mean, based on surface area, is your intestines, and then your lungs, and then your skin and then there are some smaller ones like your mouth and also your urinary tract, for example, and these can be also places where these kind of I call it infiltration can happen by bacteria or bacterial debris.
	12:03	And some inflammatory diseases or some autoimmune diseases are not more closely linked to other barriers like your urinary tract. For example, if I remember correctly, the rheumatoid arthritis is more closely linked to urinary tract infections than to bowel problems. And then you can have this gingivitis or whatever it's called in English; the problem with your mouth when you have this, and, what is it called in English, the nice pink stuff bodies right above your…
Ivor:	12:43	Oh, the gum line, the gums?
Gabor:	12:46	The gums, yeah. Because it's gingivae in Latin so that's where the gingivitis comes from. Is the inflammation of gums, literally. So, that can also be a problem due to poor oral health or lacking some teeth or having a some cavities without taking care of them or these kinds of things. Those are also locations for bacterial infiltration chronically. I mean on a continuous basis?.
Ivor:	13:16	Absolutely! And I remember that was one many years ago, I gotten great discussions and debates with people on and looked up a lot of papers. And the big debate at the time was, okay, the gingivitis and the gum disease has causal paths to cause issues. Right, true the mechanisms you touched on. No question. But also the poor oral health will correlate with poor diet. So it's a little confounded in these associations.
	13:46	But I think the answer is like in many things, there's an element of both. There's direct causal pathways from the infection, and there's an element of people with the infections are also eating and ingesting the wrong types of foods, which is also going to be contributory. But your point is well taken.
	14:03	So by the 80/20 rule, which I often bore people mentioning, I suppose I would see it that the large majority of modern ailments relating to autoimmune or indeed cardiovascular disease and many other diseases, probably the largest Pareto item or the largest single source of problem would be via the mouth. But that's not to exclude, of course, huge problems with, you know, contamination in the atmosphere and trigger massive long space and the other apertures that you mentioned. But I think the diet has probably, for the majority, is

where you'll get the most bang for the buck for most people suffering from challenges. Would that be fair to say?

Gabor: 14:51 Yeah, I think these factors can certainly add up. So, they can be viewed as a unifying mechanism disrupting these barrier surfaces. The air pollution is one of them, and environmental chemicals, life phthalates, the BPA. They are sometimes called endocrine disrupting chemicals because they kind of disrupt your hormonal system. But one way of unifying them is that they all cause some kind of a impairment in barrier function. Whether it's in your lungs or in your intestines, that doesn't matter much actually. Take smoking as an example. When you smoke, you inhale these particles; it's kind of a severe air pollution. And what happens is that it embarrassed the barrier in your lungs which is in close connection with the barrier in your intestines and it's embarrassed the barrier in your gut as well. So you see the same thing. Impaired gut barrier function. And then you very often see these smokers, this real nice beer belly, which is obviously not coming from beer but it's coming from smoking. But how? I mean how come literally? It comes through your lungs and then there is the anatomy and physiology. You can explain that through the lymphatics. These two organs are relatively closely connected. So what you actually see is the immune activation between your lung and intestines, your gut. And it also works the other way if you have problems with your gut, mainly through diet, for example, or drinking, heavily drinking alcohol, that works the same way. Alcohol and fructose, these work the same way causing imbalance in the gut. And then you are a lot more susceptible of contracting pneumonia, for example. So respiratory infections, which is crazy. First, you wouldn't think of it that, okay, I have got issues and then why am I a lot more susceptible to respiratory infections? But this is the case. And if you think about it, how the anatomy and the physiology are connected, it makes sense actually.

Ivor: 17:32 It makes sense to a relatively tiny percentage of people who have thousands of research papers analyzed like yourself. But, in the generic kind of say medical system, that's more pharmaceutical solution based. Those kinds of root causes relating to intestinal permeability and leaky gut, they're kind of very much outside the standard system. So I guess it's citizen scientists and specialists who will get this information out in time and help people more.

18:07 There's an interesting example there. And you mentioned smoking. And I love that one because there's a surprising and yet not surprising thing about smoking. If you stop smoking,

your insulin levels and insulin resistance will drop. So it's just another example of “smoking is a poison”. It has many issues and poisoning your body and also the permeability enhancement. But also the elements of smoking can oxidize and damage elements of your body, which will trigger your immune system. So there's another route back to the immune system.

18:41 So the whole thing is very much synergistic. I agree. Could we just touch now, because I think we're going to talk a little more about the lymphatic system. So, maybe give a description for the layperson off the lymphatic system and what it is and how it interacts with the body, at a high level.

Gabor: 19:01 I think basically everybody has some clue about the blood vessel, the circulatory system which distributes the blood in everybody basically, but what many are not really aware of that, there is another kind of similar structure built up similarly by vessels and it distributes the lymph. The immune system basically uses these to get from one place to the other, which is of course, a great simplification because the lymphatics also consists of lymph nodes and other primary and secondary lymph, but these are for the maturation and distribution of the immune cells, basically.

19:55 So, the lymphatics, I think the primary function is to distribute the immune cells. It also collects some other materials in the body. And because it's it is primarily considered an immune part of the immune system, it's very interesting that seemingly some non-belonging things are also distributed by the lymphatics. And then then you have to think about it, why? I mean, why, for example, the HDLs are collected from the blood through the lymphatics and not directly going back to the blood. Why it is used for that?

20:38 Or another question, why long chain fatty acids are being absorbed into the lymphatics in your small intestines and not into your portal blood? All other nutrients, amino acids, glucose, sugars are short-chain fatty acids or medium-chain fatty acids are being absorbed into the portal circulation which goes directly to your liver, but not the long-chain fatty acids? What is the reason? I mean, you have to ask the questions in order to be able to find the answers. It's totally impossible to find answers without asking question. This is my way of thinking. And I asked a lot of questions and some of those I'm obviously unable to find an immediate answer, then I start reading about it, how the system has evolved, for example, for how long it has been there, at least, at all.

21:37 I mean, for example, you tend to think of your subcutaneous fat tissues, which covers basically all your bodies and in some people, it can expand to hundreds of kilos or several hundreds of pounds. And we kind of don't question. It's there and it's always been there, but that's not the case. I mean, most of most of the animal species, they don't have subcutaneous adipose issues.

Ivor: And just to clarify, subcutaneous adipose tissue basically being the most common fat around your body on your Botox, belly all over your body, which is a healthy energy store, which as you say an evolution was developed at some point; it didn't exist prior to its development.

Gabor: 23:00 That's the type wide fat which we commonly call visceral fat because it's we didn't do the abdominal wall; it's surrounds the all the organs which is not really true because these are structured into well-defined forms. Actually, they host a lymph nodes or other lymphatic systems. So they are there more part of the immune system than part of the fat storage system which is really interesting. And there were some crazy good experiments ran something like 15, 20 years ago. And many people are not aware that they exist, that show that whenever you inject some bacteria debris, scientifically they call lipopolysaccharide; that's the form of the molecules and it's commonly abbreviated to LPS. So they inject these bacteria wall debris basically into your forearm, or leg, or into a rat's leg. And then what they observe, the adipose tissue around this injection will expand so you will have more fat on one of your legs where this lipopolysaccharide, this bacteria debris is injected. And it's it's very closely correlated with local lymph nodes. So your lymphatics, part of the immune system, so there is an immune activation and then the adipose tissue surrounding it expand so that it can provide greater support because adipose tissue, fat tissue and the new system are very closely related. They work together. One supplies the other with energy, with all the necessary lipids. I'm not only talking about lipids for energy, but all the signaling grip which can activate the immune system so that the immune system can react to an intruder or the signs of signals of the intruder much more potentially.

25:06 They get these activator lipids, these inflammatory lipids from the adipose tissue surrounding. And from this respect, there is a huge difference between the very immune-oriented visceral fats in your body and less immune-oriented subcutaneous storage fats in your body. Nevertheless, the storage form can also take up some immune functions and immune supporting functions. And then you have to think about it for a moment.

When you see a beer belly, what is a beer belly? Many people think of it as a fat accumulation - because you eat too much. And then you think about it, if you have a special kind of organ, because it's a separate organ, (the Mesentery), and the other one is called the Omentum.

26:00 These are the two distinct parts of the so-called visceral fat within your abdominal wall. They have distinct immune functions. One is filtering all the stuff, I mean, in the lymphatics from your intestines. Because the intestine is a huge area interacting with debris, I mean, there're a lot of bacteria, which is "dirty". These are not part of our inner body, but these are more part of the outside. So we have to keep them out and at every cost.

26:39 And there is this huge filter which is called the Mesentery, which is an immune organ. By the way, it contains fat cells which support the new structures within. And this can specifically expand when they are challenged. Challenged not by food but challenged by immune activation.

26:59 So, this is a very nice different kind of approach approaching the same problem. Because when I see a beer belly, I think of not overeating, but rather I think of eating some bad stuff - which can disrupt your barrier function in the gut and then it causes this access of immune activation within your belly. And then it all starts making sense what a beer belly is, and why is it called a beer belly. You drink carbs (beer is carbs) and alcohol together. So you drink a lot of beer, you are adding quick sugars and alcohol, and alcohol is known to be able to disrupt barrier function within your gut, and quick sugars are also well known for disrupting barrier function in your gut. So you are adding a double hammer-blow to your barrier function and then you lose some part of this barrier function and you have this chronic infiltration coming in, coming in continuously. And to deal with it, or your immune system taking care of the problem in this part of your body, have to enlarge so that it's able to protect other parts of your body, for example, your liver. I see, it's that simple, but most people, for some reason will not see it like this.

Ivor: 28:25 Well, yeah, Gabor, and the thing is that it seems simple and logical when you have done a huge amount of research and work around those and you have put all the pieces together. But like any massive jigsaw puzzle, if the pieces aren't pulled together, it looks like a mess and that's where most people are. Just to kind of separate it out then, again for the listener. So essentially, you've got subcutaneous adipose tissue, which is your surface body fat under your skin, that it has connections

and can perform an immune function and support for immune reactions, but not so much. Then inside you've got the visceral fat and people generally now are aware like TOFI (thin-outside-fat-inside) or beer belly people. They've got visceral fat in and around our organs, off a few different types. And the key point you're making is that these are not just fast in the different place. This type of fat is a different kind of organ, and it is an organ. It's a functional organ that works with the immune system and as part of the immune system to act as a buffer between you and your liver, roughly speaking.

29:36 So when people build this visceral adipose tissue, and the reason that correlates really well with mortality, is because if you're doing things to drive a visceral adipose tissue, this organ, that is trying to deal with leaky gut and foreign non-self offenders in the body, you're in a state of inflammation, you're in a bad state. So of course, more visceral will correlate with more bad outcomes.

Ivor: 30:05 What I love actually you mentioned LPS, lipopolysaccharide, and that is as you described, a bacterial kind of component that gets into your blood where should not be. But what I loved that you sent me I think a couple of years ago was when they introduced lipopolysaccharide, not only did it activate the immune system like you described and begin to put on more fat, but it's also been demonstrated in humans when introduced to quickly drive up insulin and insulin resistance. And that was in an – it wasn't an associational study. So it just kind of it's another level proof point to show that foreign elements coming into your body and triggering your immune system are going to link hugely to the causal pathways of many modern diseases. So it's really worth people internalizing that. It’s not just bad fat, it's actually you've created an immune reaction that's demanded this problematic fat.

31:04 I wondered, and on the lymphatic so you have tied together the lymphatic is like the blood circulation system but it's primarily maturing immune cells and delivering them around the body. And it's also engaged with the visceral fat to be part of that response to infections.

Gabor: 31:24 The visceral fat is full of lymph nodes, at least the mesenteries. It’s full of lymph nodes. The other one, the Omentum, which kind of hangs from your stomach, in front of your bellies is a different kind and this is very special immune organ so it works a little bit differently. And the main role of this is combined of total abdominals surveillance. So whatever gets through, it can launch an attack on it. It's a more broader surveillance system,

		so whenever an inflammation pops up, it's closely associated with an enlarged Omentum. So it's not limited to your intestines like the mesentery; it's a more like a total abdominal surveillance system but of course it's also closely associated with all these metabolic diseases because it's then you're all your belly guts kind of inflamed to a certain extent.
Ivor:	32:25	Yeah. And another paper we talked about sometime back, it was an amazing experiment with hugely obese men, 45 BMI, and some of them are actually had really bad blood markers and they were highly insulin resistant, and some of them are actually insulin sensitive and remarkably healthy. But they actually took photos of the man and the photos were dramatically different. The insulin resistance had a swollen beer belly appearance, and the healthy insulin sensitive huge guys had big folds and flaps of subcutaneous adipose tissue. So you can even see it in a photo.
	33:03	But one extra thing I learned from that paper and I think you sent it to me originally (great study) was that when they looked at the insulin resistance of all the people on a graph, all of the man, they found that the amount of macrophages or immune system cells in the visceral fat and the adiponectin, a hormone closely related to the signaling of adipose, those two factors together could 98% predict any individuals insulin resistance level.
Gabor:	33:40	Adiponectin is an anti-inflammatory signal from the adipose - when it's low there are issues present. Obviously, low adiponectine together with the macrophages if they are high, these together are kind of a perfect sign of the inflammation going on. So what decides between the two is the level of inflammation in the adipose tissues.
	34:05	I used to be a big believer of this, what people call a "personal fat threshold", and this hypothesis goes something like "your subcutaneous fat tissues cannot expand more, then the fats starts to go every other place and that's when you develop this visceral obesity and fatty liver, these kind of things." Actually nowadays I tend to believe that it's the other way around. So there is a different logic behind which may be at least as plausible and it goes on to like when the your visceral fat starts failing with this filtering I've mentioned, your subcutaneous fat, this inflammation gets more systemic and your subcutaneous fats start taking over. And if it can expand in a healthy way, it can keep the systemic inflammation low. So it will be more localized to your visceral fat but the fat will be kept safe and the inflammation will be kept at a low level.

35:15 And actually, those people who are able to add this kind of beneficial fat under their skins to basically unlimited extent. You often see some people when they have to be taken to the hospital and they dig a hole in the house in the wall so that they can take out this, I don't know, 900 pounds, 400 kilos, people to the hospital. These are neither diabetic. Never! and then you start thinking about that, “Okay, how's it going?”

35:54 And of course there are some conditions when you are unable to add fat under your skin for different reasons, like genetically lipodystrophy or you can develop this conditions lipodystrophy or Lipoatrophy when you are unable to add fat under your skin. And these guys are extremely lean. I mean bodybuilders envy these guys because they have basically no fat (they look ripped). All the blood vessels are clearly visible, but at the same time, they are unable to fulfill the basic role what this fat is there. So that safely store lipids after every meal, and then release it back during the night when you are not eating.

36:42 So that's the role of the subcutaneous. That’s the main role of the subcutaneous adipose tissues and these folks cannot do it. So whenever they eat, the fat in the meal just floods their blood circulation and then it gets deposited everywhere basically because they cannot deposit it in their fat tissues. So, this is a disease, and these guys are extremely insulin resistant and diabetic even if they are extremely lean. So, there are conditions but in general I think we must focus on those folks, those average folks who faced these environmental challenges. I mean poor diet, air pollution, and chronic stress, and smoking and whatever and then find the kind of unifying mechanism, how the system works.

37:42 I know one of your favorites is cardiovascular disease. And I recently got hold of an interesting paper. I think it's a very nice paper, which least… this is another problem by the way; listing symptoms, listing observations, and then accepting that, okay, this is how it is, this is how it goes. We have these lists of symptoms. Whenever you have a condition around on condition cardiovascular disease, you have this deposition in the blood vessel and blah, blah, blah, and these, these are your symptoms and this is how the disease is. And nobody ask questions and he said, “This is what I may be a little bit different. I'm not sure, but somehow I don't like to accept these hypotheses as these are presented. So, somebody shows me and then I’d say, “Okay, but how does the system work? What is the healthy state? How has the system evolved?” And then if I understand the kind of the historical background, the healthy physiology, then I may be able to address how it goes wrong. But without having a very

good picture of dimension two factors, I think it's impossible to get a good understanding of what goes wrong. And then you come up with crazy things like bombarding your blood vessels with particles which have been there for millennia. And then suddenly these are harmful…

TO BE CONTINUED IN PART 2, releasing Thursday 16th April