

An In-Depth Introduction to the Bioenergetic Theory of Health

A Special Interview With Jay Feldman

By Dr. Joseph Mercola

Dr. Joseph Mercola:

So welcome, everyone. Dr. Mercola, helping you take control of your health. And you are in for a real treat today. I've had this interview with Jay Feldman scheduled for the past month, and I've been so looking forward to it. I'm going to tell you why, but to understand why, I think I've got to give you a little backstory.

Now, you know I've recently embraced Ray Peat's work this year, earlier this year, which is a big challenge for me because I had known of Ray Peat's work for well over three decades and completely dismissed it, largely because of confirmation bias. Because I thought I knew better. And I thought his ideas were wacky and crazy. And he was a biologist, didn't know what he was talking about. So, I dismissed him. And not until literally late last year or shortly before he passed did I finally understand, largely because he was one of the earliest pioneers in helping educate the public about the dangers of linoleic acid. And there's no doubt in my mind that's probably the single biggest threat to humanity's health, is linoleic acid. So, I decided, if he was right about that, it's certainly worth exploring some other things.

So, I want to let you know right off the bat that many of you – I read the comments, and many of you are concerned about this approach of the shift from my low-carb recommendations to a high-carb. And it's understandable, and you probably likely have some confirmation bias. So hopefully, it won't take you 30 years to overcome confirmation bias [like] it took me.

But I've interviewed Georgi Dinkov in the past, and I love Georgi. I love him to death. He's so smart. His mind is literally a supercomputer. There are very few minds I know that work like his. And I'm particularly thrilled with that because I love molecular biology and I want to understand the science of recommending something. So, I've been engaging with him. But Georgi's not a clinician. That's not his forte. He's self-taught, and I think he literally has earned a Ph.D. in molecular biology and understands it really, really well. But he doesn't treat patients. That's a slight problem. And it's difficult to communicate these complex topics when you have a mind that works like Georgi.

So, in my efforts to understand this better and teach it, I encountered Jay Feldman's podcast. And I think I've had a few of his podcasts up or interviews that he has done on the site before this interview. So, some of you may be aware of that. But he, in my view, has put together the best compilation of practical understanding of how to implement Ray Peat's work. And not only implement it, but to understand it, to practically do it. And what I love about Jay is that he's not dogmatic, which is really a rarity. I mean, it's so easy to become dogmatic in this field, and he's not. He's all about individualizing, customizing for you, helping you understand and taking a very kind approach, and relatively easy and simple to understand.

So, some of you may know because I let it out before, that I'm in the process of creating a masterclass in preparation for the next crisis, which I believe is inevitable. It's not a matter of if the next crisis is coming, it's only a matter of when. And Jay understands this too, which is why he's coming to us from Ecuador. He spent a few years preparing for this strategy, and he's found a nice little community in Ecuador that can provide him what he needs — the warmth, sunshine, vitamin D, food [and] local community. So, he has got that dialed in, which is not surprising because he's such an impressive individual.

But anyway, in the process of preparedness, I put together this masterclass. It occurred to me that teaching Ray's work is really going to be one of the most important components of it. But I realized that I don't have the practical in the trenches training to do that well, at least at this point. I mean, I could do a decent job, but not as good as someone like Jay, who's been out there in the field working with this for such a long time. So, I've decided that I'm going to integrate his work into the masterclass.

Now, you don't have to wait for the masterclass to come out. Because I'm hoping to get it out this year, but it may not be. You can do his masterclass now, or at least my portion of the masterclass with his work, because he has a podcast that has, I believe, over a hundred episodes. And I am in the process of actually watching all of them. I'm on episode number 55 that I was watching this morning. And I would encourage you to do that, but don't start at the most recent. Go to the beginning, start at episode 1 and work your way up. And you will be amazed and educated as to how to practically implement these strategies. So, I would encourage you to do that now. You don't have to wait for my masterclass. Just do it now. Start at episode 1 and work your way up and watch them all. And I think it'll become really, really clear to you how and why this approach works, and it's so darn effective.

Now, I was watching episode 55 this morning. Jay has a partner, a really good friend of his, a college buddy and [he] probably knew him before college, I suspect, in high school. And they both started applying this information when they were teenagers. I mean, they've been doing this [for] a long time. And I felt really bad because — And his good friend is Mike Fave, I think. And Mike shared that early on, he went to my site and mentioned my site a few times, and adopted some of the things I was teaching at the time, which is probably over a decade ago. And I felt so bad because he got damaged, he got hurt from applying that. And it was never my intention to do that. It was always to do the best I could with the information I had at the time. So please, Jay, extend my deep apologies to Mike because that wasn't intentional.

Jay Feldman:

Of course, of course.

Dr. Joseph Mercola:

Yeah, yeah. So that's enough of an intro. Now, I've given a background, and why I'm so excited to interview Jay. I specifically have a lot of practical questions that I want to dialogue with Jay that I haven't heard him at least discuss in the first 50 episodes on his podcast about this. Because the issue is, especially in my audience, most people have been taught by me and others that low-

carb is good, that the carb is, sugar is the devil and it really is primarily responsible for all the pathology that we're seeing in society. And we know now that's not the case.

I mean, if you've been studying this, you know the fat in the form of linoleic acid is the primary thing. But also, it's not a simple solution. There's no single magic bullet. It's a complex set of recommendations to follow to help you get the proper amount of nutrients to create the maximum amount of cellular energy. It's all about – See, Peat's work is called bioenergetic medicine, and it's the process of creating the optimal amount of cellular energy and the least amount of exhaust in the form of reactive oxygen species. And this diet works. There's not a micro doubt in my mind – And I'm just sadly disappointed and have to forgive myself for not finding out or understanding this earlier.

But the questions I would think we should start with, Jay, is, since so many people watching this are on low-carb and they're not convinced yet that they need to do this, so before we get to this [inaudible 00:07:54], I think that the broader context, and I think that you would agree although I haven't heard you discuss it explicitly on your podcast, is what is the primary cause of most disease? And before I encountered Peat's work, I thought it was insulin resistance. And I still think that's the issue. Because even with high linoleic acid, you're going to have massive insulin resistance. So, it's insulin resistance.

The first question is, if you agree that it's insulin resistance, and if you do, what is a simple way to measure it? I was thinking it might be something that's simple and inexpensive as a fasting insulin. I mean, maybe that glucose tolerance test just might be better, but fasting insulin is easier, certainly, to implement. So, what is your take on insulin resistance?

Jay Feldman:

Yeah, well firstly, thank you so much for the introduction. I appreciate it and I'm happy to be here. So yeah, I think as a starting place, as you were saying, I would always come back to the idea that the amount of cellular energy that's available is what's going to drive our health. And the lack of that energy is what's going to lead to disease processes, dysfunction [and] degeneration. And so, when it comes to insulin resistance, for one, I think there's a bit of a misnomer. It's a helpful term for encapsulating a larger idea, but we get caught up on the idea of insulin. So, I prefer if we're going to say that there's one, what is the driver? It's typically a lack of energy caused by issues with producing energy or inefficiencies in producing energy due to mitochondrial dysfunction. And that causes insulin resistance-

Dr. Joseph Mercola:

So, that's-

Jay Feldman:

Because-

Dr. Joseph Mercola:

Your belief is that's the fundamental cause?

Jay Feldman:

Right.

Dr. Joseph Mercola:

Okay.

Jay Feldman:

And that causes insulin resistance, right? So, those things go hand in hand. And when we're talking about insulin resistance, we're talking about a situation where the cells aren't able to properly use glucose. The glucose builds up. And regardless of how much insulin we have, it's really hard to get more glucose into the cells, and we see rising blood sugar and all of the other downstream effects. And so, I wouldn't disagree that insulin resistance is right there. I think it's just a matter of what we call it. Do we call it insulin resistance as the fundamental problem or energy dysfunction, low metabolism issues with energy production?

So, from my view, I would say that's where we start, and insulin resistance is an effect of that. And the only reason why I would make that distinction or say that it's important is because I think with insulin resistance, we can get caught up in the idea that insulin is the problem and things that increase insulin will cause the cells to stop responding to insulin. And we need to figure out why the cells aren't responding to insulin. And if we get down to that deeper layer, it's really coming back to an issue with producing energy.

Dr. Joseph Mercola:

Okay. So, thank you for that perspective, and I suspect it's somewhat similar to vitamin D. And one of the course modules I – one of the most important courses is course number one that I put together, is on sun exposure. And it wasn't vitamin D, it was sun exposure. But one of the artifacts of exposing your skin to sun, which you wisely chose Ecuador to live in so you can get that year-round without swallowing any vitamin D capsule, is that you're going to get vitamin D. But you're also going to get many other benefits. Yet if you were to use a simple marker to measure sun exposure, it might be vitamin D, assuming you weren't swallowing any vitamin D supplements.

So, if your vitamin D level was high, like mine is over a hundred in the summer without having taken any vitamin D supplements for well over a decade, then that means I'm getting all the other benefits from exposing my skin to sun. So, acknowledging that it's a more fundamental issue of not being able to create cellular energy. Would you agree though that a simple fasting insulin might be a good biomarker that we could have to measure our efforts to restore cellular energy?

Jay Feldman:

Definitely. And it's a great comparison there, a great analogy. And like the vitamin D situation, we always want to keep in mind the caveats where we can decrease fasting insulin or decrease glucose by avoiding carbohydrates, even if that's not fixing the problem. So, that's a really important distinction to make. But assuming that that's not the case, [that] we're not in one of those exceptions, then yes, looking at something like fasting insulin and other markers of insulin resistance – you mentioned the glucose tolerance test, which as you alluded to is a little bit less convenient. But in somebody who is consuming some amount of carbohydrates, looking at fasting insulin is a good marker of how well we're using the glucose and how well we're producing energy.

Dr. Joseph Mercola:

Okay, good. I'm glad we're in agreement on that, because it seems like – And it's a relatively inexpensive test, it's not going to cost you an arm and a leg. I mean, it probably costs less expensive than a vitamin D [test]. So, that's a good start. So, I guess the practical implementation that I would so deeply appreciate your insights and feedback on is, how does one progress from a low-carb diet and addressing this insulin resistance? Because [a] low-carb diet will cause insulin resistance. There's no question it will. It's not appreciated because your insulin levels and glucose levels are low, so it's kind of [a] hidden, stealth insulin resistance. But how do you progress? Your typical person who's just found the light and understands that, “Wow, I think I could do better by integrating some healthy carbohydrates into our diet.” So, what is your initial strategy to do that, to get them from low-carb to healthy high carbs?

Jay Feldman:

Yeah. And it's a perfect question, and as we were alluding to, when we take out the carbs, we're just avoiding the problem. We haven't actually fixed the underlying energy dysfunction. And it's very similar to, I think, an analogy that we can all agree upon, which is the cholesterol, blood levels of cholesterol not causing heart disease. It's a scapegoat, it's a symptom, but it's not actually a driver there. And in the same way, I would say glucose and insulin are byproducts of this underlying issue with energy production that we see in elevated levels in insulin resistance and diabetes. So that's why, again, we don't want to be blaming the carbohydrates. It's the fact that we can't use them well.

And so, when we've come to that conclusion and we're able to say, “All right, I recognize that removing carbohydrates is not the solution, I want to be able to bring them back in, but I want to make sure that I'm using them well. How do we do that?” How do we do that one coming from low-carb? This was something I did personally. I spent quite a long time in ketosis and cyclical ketosis and various low-carb iterations and fasting and all of that.

Dr. Joseph Mercola:

Right, the whole deal, you were there. Been there and done that. It's not like you haven't explored that area.

Jay Feldman:

Absolutely. And most of the clients who I'm working with, or a good portion, are also coming from that place. And they've experienced the byproducts later on of poor sleep, insomnia [and] increased anxiety sometimes. Sometimes the rise in fasting glucose, sometimes drops in testosterone, drops in T3, drops in energy, drops in performance in the gym. So, I experienced many of those things. A lot of the clients I'm working with have also experienced those. And so now when we come to the point of recognizing that wasn't a solution, it was just a Band-Aid that helps short-term but came at a long-term cost. What do we do in order to bring carbohydrates back in a healthy way so that we improve our ability to utilize them and minimize any negative effects?

I think the first place that we both agree on is avoiding the polyunsaturated fats (PUFAs). That includes the seed oils, the omega-6s. I would throw the omega-3s in there as well. And I'm sure that's a longer discussion we can have another time. But taking out the polyunsaturated fats would be top of the list. And that's because they're really effective at interfering with our ability to produce energy and utilize glucose, beyond all the other negative effects there. So, that would be step one. We want to make sure that we're avoiding the polyunsaturated fats and instead using monounsaturated and saturated fats as our fat sources.

After that, the question would be, what types of carbohydrates do we bring in and in what amount? And my general starting place or my general mode of implementing any sort of intervention is always slow and steady, it's always careful. Because the slower and more carefully that we experiment and make changes, the easier it is to determine whether we might've made a mistake. Also, the more time we give our bodies to adjust to that, because as you were mentioning, if we're in low-carb, we've caused insulin resistance. And anyone who is low-carb and then takes a glucose tolerance test will see that.

So, we need to bring the carbs in slowly to slowly upregulate the enzymes that increase carb utilization and conversion to energy. So, slow and steady is always my approach there. And along with that, it's really important that we make sure that we're bringing in the types of carbohydrates that are not going to cause intestinal irritation or endotoxin production, that we're going to digest really easily. Ideally, that also have some good polyphenols and other nutrients, micronutrients, along with them.

And so, normally the place I'd like to start is with some whole fruits, and again, starting very slow. One caveat here that we can come back to, because we can almost separate into two situations. One is when we have underlying gut issues, microbial overgrowth, bacterial overgrowths that cause a lot of endotoxin. And if we're dealing with a major issue there, we want to be really careful about introducing any fermentable carbohydrate. So, that includes fibers that are in fruits and sometimes some other carbohydrates in fruits. And that might be a different situation where we want to focus on very low fermentable carbohydrate sources. And that might be leaning into fruit juice over fruit, for example. But just particular fruit juices, we'd want to be careful with apple juice, for example, because there are fermentable carbohydrates in there. So, there are some nuances there, but the place I would generally start is small amounts of whole fruit, assuming that someone doesn't have underlying digestive issues.

Dr. Joseph Mercola:

All right, so that's a really good point. And what symptoms or tests can be done to alert the person that they have these underlying digestive issues, which may predispose them from complications that wouldn't occur if they didn't, and implementing the whole fruits, which is the ideal if you can tolerate them?

Jay Feldman:

So fortunately, symptoms are the easiest way to tell, and normally the symptoms are relatively clear. So, if you start to bring in whole fruits and you're noticing increases in gas or bloating, if you're noticing any gurgling, belching, or if you're feeling sluggish and lethargic after maybe the first short period of time, all of those could be signs of an intestinal issue. Another easy way to test would just be to have a bit of whole fruit sometimes and then have fruit juice at other times. And see if you notice a major difference between those two scenarios.

If you feel a lot better with the fruit juice, then that's a pretty clear sign that we were having some issues with the fermentable carbohydrates. And we'll want to be really careful with those and work on restoring a proper microbiome. Whereas if we do better with the fruits or equal with both, and maybe we're not doing so well with either, that would be a sign that maybe we need to increase more slowly or consider some other support for increasing our utilization of the carbohydrates.

And the other thing there is it could just take some time because what we see – and this is clear in the research, as we increase carbohydrate intake, it increases insulin sensitivity. But we have to go through the steps to get there. And when we're coming from zero or very low, it will take a little bit of time to shift the hormonal state, the mitochondrial enzymes, all of those things to help increase our utilization of the carbohydrates and improve or restore insulin sensitivity.

Dr. Joseph Mercola:

And what's a typical range of time that you would anticipate?

Jay Feldman:

Again, I like to use symptoms as the clearest way to guide us. And so, if we're starting by, let's say, just adding a piece of fruit with each meal, so carbohydrates are still pretty low at that point, maybe we're talking 40 to 80 grams of carbs depending on how much fruit we've had. I think that's never going to be the end point, but you might want to stay there for a week, two weeks, until just as long as you know that you are feeling better than you were prior. Maybe you're seeing a bit of improvement in sleep, you're feeling a little bit better in terms of brain function or energy.

If you're starting to notice that, you're seeing maybe your appetite come up, which is actually a pretty good sign of your metabolic rate increasing. If you're starting to increase those things or see those things, that's a great sign. And I would say you can start to increase from there. If you're having any negative effects, that's when I would push the brakes a little bit and go slower. But that would be a starting place. And again, assuming that you're noticing the benefits, you

could add a second serving a fruit with each meal, double it. Or maybe a little even slower than that and see how you're responding.

Dr. Joseph Mercola:

Okay. So, you have a very conservative, slow approach, safe journey towards getting optimally healthy. And what would be the end point? It seems, from listening to your podcast, that you and Mike both agree that the baseline for humans is about 150 grams of healthy carbs, if you're going to be – unless you're maybe [a] 65-pound child or something. But about 150 grams, and it could go up as high as 400 grams or 500 grams or 600 grams, depending on your activity and size level. Would that be the typical range?

Jay Feldman:

Yeah, definitely. And it depends on what line of evidence we want to go down. If we look at the amount of glucose output from the liver when we first start fasting – and actually, if we extrapolate that out, it comes out to about 220 grams per day. So that would suggest that in an optimal carb-utilizing state, we would even have at least that 220 grams. And normally, when we're looking at that research that looks at the amount of carbohydrates and maximum insulin sensitivity, you start to see minimal increases or improvements after the 250-gram mark. So, after that, I would normally say 150 to 250 [grams] is baseline for most people, average size, all of the exceptions. And then adding on from there based on, again, body size, based on activity, all of those things.

Dr. Joseph Mercola:

That's good. I didn't realize it was actually even higher. Because typically if you're a low-carber like many people, 150 grams is a lot of carbs. And that's still inadequate based on the studies you cited, which [inaudible 00:22:04] the basal output of glycogen produced by the liver is about 250 grams a day.

Jay Feldman:

Yeah, about 220 [grams]. And the important caveat is, that decreases over time. If we shift out of the utilization of glucose, our body tries to conserve it when we stop consuming carbohydrates and we lean into fats. And so, it's really hard to determine how much is really the baseline need. And so, some of these studies look at what happens just in the first hour. And I think that's probably a better representation as opposed to looking over a 24-hour period, where over that time, you started to shift away from using glucose.

Dr. Joseph Mercola:

Yup. And I just want to get back to some basic science with respect to the symptoms of whether you have a condition that would suggest that you have to be ultra-careful and not have any – basically have fruit juices, not a fruit because the fiber could be a problem. And it's because you're generating gas. And the gas is a symptom of the fact that the carbohydrates you're eating are not being digested by you. They're traversing your stomach and your small intestine going to

the large intestine where they're digested or fermented by the bacteria there. And part of the end products of that fermentation is gas.

Jay Feldman:

Yeah, yeah. Absolutely.

Dr. Joseph Mercola:

I guess, would you agree that one of the symptoms that you know are – at least your microbiome or your gut is healthy enough and you're eating the right types of foods, is that you really have minimal gas production, either passing gas or as flatulence or belching?

Jay Feldman:

Yeah, typically we want that to be pretty minimal. Yeah. And this is central. You can't overstate. In the same way we can't overstate the importance of avoiding PUFA, we cannot overstate how much endotoxin that these bacterial byproducts destroy our health. And you see it in every chronic health state or chronic health condition. Every degenerative condition, you see this mild endotoxemia. You see it in fatty liver disease and diabetes, obesity, atherosclerosis and on from there.

And so, this is one of the main reasons why people feel better. One of the main reasons why people feel better on a low-carb diet or when they're fasting is because they're avoiding anything that's feeding the intestines. So, if you are one of those people who felt way better and lost weight and noticed a bunch of improvements, there are two main reasons why that would be the case. One, as I mentioned, is reductions in endotoxin. And they see this in the research where they take mice that are on a low-carb or ketogenic diet, and then mice that aren't. The mice on the ketogenic diet get certain benefits even in epilepsy, and they just transplant the microbiome. And the other mice get the same benefits.

They can also then introduce the endotoxin back and all those benefits go away. So, we see this very clearly. We see it in other disease states as well with germ-free mice where they introduce antibiotics. It clears out all the bacteria, clears out the endotoxin. All of a sudden fatty liver disease is gone, or it can't be caused by the alcohol or fructose. So, the gut is a huge, huge factor here. It can't be overstated.

And again, if you were one of those people who felt much better going into low-carb, you probably want to be pretty careful when bringing carbohydrates back in. Because it's likely that there are some overgrowths that weren't actually resolved. And so, you might have issues with the fiber. And as you were saying, if you're producing gas, if you're feeling any intestinal discomfort, bloating, those types of things, that's a pretty clear sign that there's probably some excess endotoxin production going on as a byproduct of these bacteria feeding on what you're feeding them. And so, that's a separate issue that we would want to resolve.

And that brings us to the other possible reason why someone might feel much better on a low-carb diet, and that's if they were already extremely insulin-resistant going in. They were having a

lot of trouble using glucose going in, and so switching to fat and potentially ketones led to a lot of relief. And if you were one of those people, this is also a situation – and again, this is why I suggest being careful and doing this slowly – that's likely also a situation where your utilization of the carbohydrates is going to have to be ramped up slowly, and your capacity for that might be a little bit lower. And so, we want to work on resolving that issue.

Could be caused by endotoxin, could be caused by polyunsaturated fats, could be caused by nutrient deficiencies, could be caused by a lack of sleep and other forms of stress. But that's another situation. If you lost a lot of weight on low-carb, if you were very insulin-resistant before, we want to be particularly careful bringing carbohydrates back in. And that's one of the times that would warrant going a little slower. Again, if someone didn't have these major benefits on low-carb, you might be able to bring in the carbs much faster and feel much better quicker. But that's why it's all dependent on the individual's context.

Dr. Joseph Mercola:

That's a really good tip. So, with respect to the endotoxin, another name for that is LPS or lipopolysaccharide. And it's a component of the cell wall of gram-negative bacteria. So, I'm wondering, at least my belief is that by gradually readjusting the foods, increasing the carbohydrates, you're actually going to change the microbiome of the gut and, essentially, competitively inhibit the growth of these bacteria, so that you're going to be producing less endotoxin. Would that be a safe assumption? Or what is your belief of what goes on? Or [do] the gram-positive also have some product that is an endotoxin, that is detrimental?

Jay Feldman:

They do. So, we can come back to that, but it's a really, really important point to highlight, and something that when you see all these pieces fit together, it just makes so much sense. When you see the effects of something like whole fruit on the microbiome, you see the types of fiber, alongside the polyphenols, they shape the microbiome in a particular way that reduces the harmful bacteria and supports some of the more beneficial bacteria. It's almost as if we evolved eating fruit and created a microbiome that was conducive with our physiology based on that. Of course, I'm being a little facetious here. I think that's probably a large part of what happened.

And so again, when we're talking fruit or even root vegetables — potatoes, sweet potatoes, carrots [and] parsnips, all of those — the polyphenols in there have mild antimicrobial effects, mild antibiotic effects that help to clear out some of these harmful bacteria, so if you don't have a major overgrowth and you can slowly increase your consumption of these types of carbohydrate sources, you'll naturally start to see a beneficial shift in your microbiome. So again, we have that fine line between too many symptoms and needing to address it directly, but for someone else who's doing all right, it should happen on its own, and I think that's part of the beauty of it.

Not to mention the presence of the carbohydrates in the intestines being incredibly anti-inflammatory, as something that feeds the cells that line the intestines. And also, not to mention it helps increase thyroid hormone, which will increase stomach acid, bile flow and motility. So, a number of different processes going on here that help us maintain a healthy gut when we're consuming a carbohydrate-rich diet from these sorts of sources. I would say that is the natural

byproduct, but as you had asked, there are concerns with gram-positive bacteria as well. So, they produce a parallel toxin to LPS, which is called LTA, lipoteichoic acid, and it has a lot of similar effects. It's not studied as much. It's not used as widely in the research to cause inflammation and interfere with mitochondrial function, but it does seem to have very parallel effects.

And so, what that essentially means is we can't chalk it all down to gram-negative versus gram-positive, one being beneficial, one being harmful. But rather, there's different species of bacteria within both gram-positive and gram-negative that are beneficial and that are relatively harmful. The good news is we don't have to go and sort out each of which they are, which can be helpful to go through as well. But if we're just consuming a healthy carbohydrate-rich diet that's also rich in polyphenols, it'll naturally shape our microbiome to get rid of the more harmful ones. Not to mention, it'll keep our low intestinal permeability and good motility, which, if there are any toxins produced, it'll help those be cleared out much quicker and prevent them from entering the bloodstream.

Plus, if we're consuming saturated, monounsaturated fats, those also have antimicrobial effects. Bile also has an antimicrobial effect, so consuming enough fat is also really supportive for our digestion through those means. This is part of why be careful with the super low-fat diet, and these sorts of fats will also help to detoxify the endotoxin or LTA as well from the intestines. They carry them directly to the liver to be detoxified. So again, it's helpful to look at each of these steps, because sometimes we need to address them directly. But the good news is as long as we're having a "healthy diet," which of course it can mean different things depending on who we're talking to, but these things, luckily, will sort themselves out.

Dr. Joseph Mercola:

It's important to understand, at least from my perspective, that the Ray Peat community is not homogenous, that there's actually a wide range of recommendations that exist, and specifically on this topic, because there's a fair percentage of the Peat community who advocate and actually do themselves gut sterilization with antibiotics. I know Danny, Roddy and Georgi have discussed that on their podcast, the different antibiotics that can be used.

From a natural physician perspective, there are obviously concerns, and some antibiotics are worse than others, much worse, [and] should almost never be taken unless it's a life or death situation, but nevertheless, I still think that ideally, it's best to avoid. I'm wondering what your perspective is, because I don't think I've ever heard you advocate antibiotics directly, although I imagine there might be a situation, a rare anomaly where that may be the best option, but what's your view on the antibiotic serialization that many of the Peat community advocate?

Jay Feldman:

Yeah, so it very much depends on the individual. If we're dealing with a clear overgrowth, let's say, in the small intestine, I think it's really important to help clear that out. It may happen on its own, when we get thyroid function in place, take out some of the antinutrient-containing foods, and maybe avoid the fibers for a period of time. But if not, I think it can really help to have some version of antibiotics, whether it's pharmaceutical, herbal or from the food to help support that, to help clear those out.

It's rare that I go to antibiotics for SIBO (small intestinal bacterial overgrowth) unless we're looking at something like rifaximin or maybe neomycin, depending if it's methane dominant or hydrogen dominant, where rifaximin only affects the small intestine, for example. So, we're not interfering with the large intestinal microbiome, and that can be extremely helpful if somebody's had really intense small intestinal bacterial overgrowths that they can't clear out, so there might be a place for something like rifaximin. If it's methane dominant, maybe rifaximin alongside neomycin, but neomycin will affect a large intestine. I'll also say that this is never the first route that I would go. I think there's-

Dr. Joseph Mercola:

And both of those aren't absorbed systemically, right?

Jay Feldman:

Right.

Dr. Joseph Mercola:

Okay. Well, like almost all other antibiotics, you're not going to get it in your blood. It stays topical on the surface of the intestine.

Jay Feldman:

Mm-hmm, and when it comes to restoring the large intestinal microbiome, again, I'd prefer not to do it with antibiotics, because they will clear out both beneficial and harmful bacteria, and I think having a sterile large intestine is not really viable in the world, right? In a lab, that's one thing, but I think as far as a large intestine goes, not in a lab, not in a rat in a lab, we need to have some bacteria there.

Otherwise, we're very susceptible to infection from the harmful bacteria. But there are situations where that microbiome is so out of whack that just adjusting the diet and maybe using some herbal antimicrobials, maybe using some spore-based probiotics, maybe those things aren't enough to rebalance the microbiome, and I might look to antibiotics at that point. Or someone has maybe some sort of signs of systemic infection that we're not able to clear. Again, it would be very particular antibiotics, and I tend to recommend actually low dose antibiotics for a longer period of time as opposed to a high dose. But this is, again, a relatively rare incidence. I'm normally not using these for most people.

Dr. Joseph Mercola:

I thought that was the case, so thank you for expanding on that. Maybe you can shift now to the other types of carbohydrates, because even if you don't need these antibiotic approaches and you have a relatively healthy gut, you're not having bloating, gas symptoms, you just may develop those if you introduce the wrong type of carbohydrates, because some should be avoided assiduously and really shouldn't be consumed, because they're not really ideal for human health, because you can't digest them and they only serve as fuel for the bacteria in the large intestines.

So why don't you review that, because that seems to be another part of the puzzle, this complex puzzle, actually.

Jay Feldman:

Yeah, so we mentioned fruit already, and fruit isn't just whole fruit, but it also could be fruit juice, it can be frozen fruit, dried fruit, depending on your circumstances-

Dr. Joseph Mercola:

I'm sorry for the interruption, but dried fruit, I was actually going to look this up, but there are specific types of dried fruit, because I believe that they use – I'm not sure what the preserve is, like nitrates or something in there that-

Jay Feldman:

Sulfur dioxide.

Dr. Joseph Mercola:

Oh, sulfur. That's it. The sulfur dioxide, yeah. So, what are the guidelines for selecting a healthy dried fruit?

Jay Feldman:

So, depending on the type, typically organic. Of course, there are some types of fruits that actually there isn't much pesticide use, so we don't need to choose organic, but I generally think it's better-quality, anyway, so that would be part one. I would suggest no sulfur dioxide, no sulfites, no artificial colors, so you can get some pretty bad-quality dried fruit that has all of those things in it. So, none of those. It should just be pure, whatever the fruit is, and nothing else. When it comes to some of the berries, they'll use sunflower oil to prevent them from all sticking together.

Dr. Joseph Mercola:

Wow.

Jay Feldman:

But the amount is really, really tiny. If you look at a serving size, it'll say 40 grams of carbs, zero fat, zero grams of fat. So, the amount of sunflower oil used is so small that I probably wouldn't concern myself with it. Some people are so concerned, because they see sunflower oil, but it's actually nearly none. So yeah, organic, and the only real ingredient should be the fruit itself, no added sugar, which is really rare. No colors, nothing like that. Then, we just have to be careful about whether someone does well with fiber or not, because you're going to get a concentrated dose of it with the dried fruit, even more so than you'll get with the whole fruit.

Dr. Joseph Mercola:

Okay, good. Thanks. All right. So, I'll let you go on with the other types of carbohydrates that could be problematic.

Jay Feldman:

So, we have fruit, is a really great one. Another great one, as I mentioned, if you tolerate it well, depending on your gut health and your insulin sensitivity, would be the root vegetables: potatoes, sweet potatoes, parsnips [and] carrots, all of those, and we could throw white rice in there as well, as long as these are all really well-cooked, and often I would recommend consumed with some form of saturated fat as a way to make sure that they aren't feeding the bacteria because of the antimicrobial effect of the saturated fat and also the bile stimulation. So that would be another really great source. Those are probably the two main sources, and along with that, honey.

Good-quality honey and good-quality maple syrup, I think, can also fit into those categories as, again, in these categories we're talking about high-nutrient, high-polyphenol, some fiber for people who tolerate it well, these would be the best carbohydrate sources. We can then get into maybe more of the gray area, where we have the grains that are maybe well-processed, traditionally processed, fermented, soaked and sprouted. Those can be okay. I don't normally recommend starting with those, because even if, let's say, you have sourdough bread that's long fermented, there's still going to be some gluten in there. Some people really don't respond well to that, among other anti-nutrients in there. So, the soaked, sprouted, fermented grains are somewhere in the middle there.

Some people tolerate them to some extent, but I wouldn't put them in the optimal category. They're somewhere in the middle. On the kind of more harmful end, we have unprocessed grains, right? Typical whole wheat or wheat flour, and I guess all the others that fall in there. Brown rice, those kinds of things. Those would be ones that are typically on my avoid list. They're very high in the antinutrients, which impair all aspects of our digestion. They can reduce stomach acid, reduce protein digestion [and] starch digestion. You're consuming starch, that's not a good combination. They can reduce mineral absorption [and] vitamin absorption. For a number of reasons, we want to avoid the antinutrients that are in the grains, and also sometimes in the skins of the root vegetables. So, if you're eating potato, sweet potato, I recommend not consuming the skin for that reason.

Dr. Joseph Mercola:

Well, the grains also have lots of linoleic acid, too.

Jay Feldman:

Yeah, they typically do. Of course, not as much as in the concentrated seed oils.

Dr. Joseph Mercola:

Yes, sure.

Jay Feldman:

Yes, they do have the PUFA-

Dr. Joseph Mercola:

But they count, and the average person's taking way too much, and it takes three years to get it down to healthy levels, so there's no [inaudible 00:39:24], for sure.

Jay Feldman:

Of course. Yeah, yeah. Of course. And all of this is – then we're not even talking about any sort of processed food that would have seed oils in it and everything, so when we're talking about carbohydrates, I wouldn't consider those anywhere near the list that we would want to go toward.

Dr. Joseph Mercola:

That is actually – when you're making a recommendation to someone who doesn't really want to dive deep into the weeds like we're doing now, one of the simplest and most accurate recommendations is you cannot have any processed foods. Simply, zero. You eliminate them from your diet, and that's going to have a radical improvement, just by that one simple recommendation.

Jay Feldman:

Definitely. And later on, when someone's doing well, and they want to have more variety, there are decent “processed food options” that aren't so bad. I mean, there's potato chips cooked in olive oil, right? And that's not so bad if you need a snack, and you're doing okay in other areas-

Dr. Joseph Mercola:

How about coconut oil? Do they cook them in coconut oil too?

Jay Feldman:

Yeah. That's even better, but they're harder and harder to find. The main brands that were cooking in coconut oil have largely stopped, and they switched.

Dr. Joseph Mercola:

Really? I didn't even know that that was a viable commercial option, that anyone made that.

Jay Feldman:

Well, maybe it's not anymore.

Dr. Joseph Mercola:

Okay.

Jay Feldman:

So, there are some “processed food options,” or you can make healthy alternatives to those things. So, I don't think it's a necessarily never, but occasional and only if you're already doing pretty well health-wise and doing well with the carbohydrates.

Dr. Joseph Mercola:

Okay, well, thank you for that distinction. All right, so that's been really helpful. The grains, you have to be careful of in general, for the reasons you discussed. So, let's get back to a person who has insulin resistance based on the fasting insulin level and yet had done low-carb, and now is eating – has been on a program for six months or so, and still, the ideal fasting insulin measurement should be below 3. That's your goal. If it's lower, that's even better, but say they are like 7 or 8. I mean, do you use this as a tool to help determine their metabolic flexibility? Because what I neglected to mention earlier that's so important, I've said it many times and I'm sure you're aware of it, that there was a study published last year in [the] Journal of American College of Cardiology that was based on NHANES (National Health and Nutrition Examination Survey) data that studied it from 2018.

They found that 14 out of 15 people, 93% of the population, were metabolically inflexible. That's, in my view – they used a variety of clinical characteristics, but essentially that's insulin resistance. That data was 5 years old, 5 years old, so it's probably about 95% of people, at least 19 out of 20. So, if we agree that insulin resistance or fasting insulin is the best way to measure that metabolic flexibility, it would seem that would be a simple, inexpensive strategy to monitor your progress with this program. So, I'm wondering what you do when you encounter a person who's not at that 3 level, still relatively high on multiple times? Do you just keep going with the program or is there anything special, any type of supplements or anything? Any other advice you'd have for that type of individual?

Jay Feldman:

Definitely, yeah. Definitely. I normally would look for around a level of 5 or lower, as far as insulin levels go, but in any case, the other thing I would throw in there symptom-wise, if somebody is struggling to improve or restore their insulin sensitivity, we'll probably know through other ways as well. They might be gaining weight; their energy might be low. So, if those things are happening, we can also assume that there's some sort of other issue going on. It could be digestive, it could be issues with carbon metabolism, whatever it is, and so that's normally something we can just see day-to-day, week-to-week, month-to-month, without just needing the test. But of course, corroborating those things with the test is helpful, and looking at other blood markers is helpful, too, to help us identify where that problem actually is, and fasting insulin can help with that. In that situation, there are a number of things I would go to, but again, the question is, what is causing the issue with converting those carbohydrates to energy?

We talked about endotoxin being a huge one. That's one of the more common ones. If someone's already cut out the polyunsaturated fats, endotoxin is really common, so we want to make sure

that we've fixed everything up gut-wise. If not, that would be my target. If that's doing pretty well, and we're generally not overstressing, we're getting some good comfortable movement in, and we're eating carbohydrates from the right sources, and we're still not seeing the benefits that we were looking for, we're still not seeing the restoration of insulin sensitivity, then I might look for some other support for glucose metabolism. That could be B vitamins, B1 and B3 in particular. I know you've talked a lot about niacinamide. Thiamine is another one that is crucial for producing energy from carbohydrates, and it's not just those two. Biotin is involved, vitamin B5 is involved, so a number of the B vitamins are incredibly important.

Dr. Joseph Mercola:

B2, right? [inaudible 00:44:35] FAD (flavin adenine dinucleotide)?

Jay Feldman:

Yeah, absolutely. So, supplementing with those would be potentially warranted there. And in general, those are things I see a ton of benefits from in terms of liver health, digestive health, just lowering stress [and] improving insulin sensitivity, so that would be something I'd look to there. I would also be looking at other hormonal indications. I'd be looking at thyroid status at that point, because if we've made some of these shifts but we're not seeing the conversion from T4 to T3 or we're not seeing good thyroid hormone production, there could be a higher-level issue that's causing a ton of things further down the chain, and that can include insulin insensitivity, insulin resistance.

So, if that's the case, I would look toward doing everything we can to restore that, and if not, maybe looking to some supplementation to support that, either with the T4, T3 [or] hormones, maybe sometimes just with T3, depending on the instance, but that's something I would consider. I would also look at the steroid sex hormone production for women, looking at whether there's maybe too high of estrogen, maybe not enough progesterone. That can be another huge factor here that can drive or contribute to insulin resistance. For men, I'd be looking at low testosterone. So, I know you've talked through some of those hormones, and there's certainly a place for things like pregnenolone, progesterone, maybe a bit of DHEA (dehydroepiandrosterone) to help support that hormonal state as well. Sometimes that's more of the level that's causing the insulin resistance, rather than something within the mitochondria per se.

Dr. Joseph Mercola:

Yeah. I didn't realize that was so intimately connected. That's great. So, thank you for sharing that. Now, let's get back to the basics with respect to what is the ideal fuel for a body. For the longest time, I was teaching it was fat. That was my understanding of mitochondrial physiology, and of course I could pull up studies to justify that. Now, I've learned that it is not the case, that beta-oxidation of those long-chain fats is actually going to cause 30 to 40 times as much reactive oxygen species, and is not going to generate the ideal fuel with the minimal amount of oxidative species.

So, I'd like you to discuss that. Actually, one of the justifications for having high amounts of fat – I was thinking about asking this when you were discussing the endotoxin – is that the

generation of short-chain fatty acids in the intestine, specifically really small ones, like butyrate, which is a four-carbon fat, is thought to be highly beneficial and nourishing for the enterocytes, the cells lining the intestine. So, do you believe that that's going to help happen normally when you're eating healthy, and that there's no additional benefit to adding supplemental butyric acid or extra fat to produce that butyric acid?

Jay Feldman:

Well, most supplemental butyrate doesn't actually make it to the large intestine.

Dr. Joseph Mercola:

Yeah. You have to use it as a depository.

Jay Feldman:

Right. You could do that or you can feed fiber, so things like apple pectin, which is just fiber from apple, will increase the production of butyrate, and so that's my preferred route. If we're getting fibers from fruits, and we're able to handle them, we have a decent healthy microbiome, then we're naturally going to be producing some amount of those short-chain fatty acids. I think that's "normal and healthy." I think when we look at the interactions between the bacteria, you have the ones who produce short-chain fatty acids, the ones that consume them, you have this whole ecosystem. As you said, those cells that line the intestines use them as well, so I think that's a part of all of this, but I don't think we necessarily want to consume fats for that effect.

Dr. Joseph Mercola:

Okay, so getting back to the mitochondria, one of the benefits of optimizing the fuel in the mitochondria and having it be primarily glucose is that you're going to generate two interesting byproducts and molecules. One is metabolic water, otherwise known as deuterium-depleted water, so it doesn't plug up the ATP (adenosine triphosphate) synthase, and also carbon dioxide, which is commonly thought of as a waste product. But Peat has made it abundantly clear that this is a massively important molecule, and a far superior and more important vasodilator than nitric oxide.

It is the primary one, is carbon dioxide. When you are low on carbon dioxide, you can't be optimally healthy. If you're burning, oxidizing fat in your mitochondria, rather than glucose, you're not going to generate as much. It also serves another role as protecting the proteins from being glycosylated – Peat discusses it, [it] attaches very specific sites on the proteins that essentially creates this shield, this bulletproof shield around them that prevents glycosylation. So maybe you could discuss that and the optimal fuel that we were designed to have to eat.

Jay Feldman:

Yeah, yeah. And the carbon dioxide also protects against lipid peroxidation, it counteracts the reactive oxygen and nitrogen species, so a lot of benefits there. But to zoom out, I think it's always helpful to put this in the larger biological context. And so, any situation where we are

starved, where we're under major stress, when things are dysfunctional, we shift into fat oxidation, fat burning. And this includes when we're not eating anything, right? This is why when we're fasting, we will shift into ketosis eventually, and also, we can mimic those states by going on a low-carb, high-fat diet and low protein. The biological context there is our bodies view that as a situation when we're under stress, when we don't have a lot of fuel available, when they're in a famine, when we need to survive for a long period of time.

In a situation like that, we want to decrease our metabolic rate. We don't want to use a lot of energy on reproduction, on cognition, on digestion, on growth and repair. We want to conserve energy, because we don't know when we're getting food again. If we're starving, we don't want to keep our metabolic grades super high, because we won't survive very long. So, everything around fat burning involves a slowing of the metabolic rate, and we see this again on that bigger picture level. We see it when we look at thyroid hormone conversion, which gets impaired when we're low in carbohydrate intake. We see it in terms of testosterone, and we also see it on the mitochondrial level, because on the mitochondrial level, that's where this all starts.

That's how our body senses whether it's burning the fats or the carbs. When it's burning fats, it has a number of different places that slow down the actual respiration, that slow down the conversion from the fats to energy. And again, this is all healthy and adaptive, in that it allows us to survive if we're starving. But it's not ideal for thriving. It's not ideal for optimal function. It's not ideal for reproduction. Our bodies don't want to reproduce if there's no food available. It's not ideal for high-level cognition, high-order thinking. When we zoom into the mitochondria, we see all of this happening in the biochemical levels.

What we see is that the primary difference between glycolysis, the starting of burning carbs and the beta-oxidation of the fats is a difference in the amount of NADH (reduced nicotinamide adenine dinucleotide) and FADH₂ (flavin adenine dinucleotide) that gets produced. And when we then finish out through the Krebs cycle, and then go to the electron transport chain, depending on the length of the fatty acid, there will be considerably more, sometimes 250% as much FADH₂ relative to NADH. What happens is, because we have this major drop off of electrons at complex II through the FADH₂, relative to the complex I, what we end up with is what you've described before, reverse electron transport. The reason for this is because-

Dr. Joseph Mercola:

Oh. I know the term for this. Reductive-

Jay Feldman:

Exactly. Reductive stress. And that's because complex I and complex II both use the CoQ (coenzyme Q) electron acceptor. And so, if you're favoring complex II, you're going to reduce the amount of electrons that can be dropped off at complex I, and you're going to reduce the amount of electrons at complex I that can keep going down the chain. So, you get a buildup there, and you get this reverse electron transported major production of reactive oxygen species at complex I. The other thing that happens is, because of this buildup at complex one, the NADH can't drop off its electrons. And so, you get this buildup of NADH relative to NAD (nicotinamide adenine dinucleotide).

Our bodies are really smart when they see this, because this then affects everything further up the chain. It affects various steps of the Krebs cycle. There are three different steps that need the NAD, so each of those get reduced. The activity of those steps gets reduced, so we're slowing the activity through the Krebs cycle. We're getting buildups of citrate, for example, that increases the synthesis of fat, and that gets built up even further. We end up with a buildup of acetyl-CoAs that reduces the conversion of pyruvate to acetyl-CoA, which also is dependent on NADs, so we've got two ways that that's being inhibited.

And then when you look back up at glycolysis, there's a number of steps there that get inhibited as well due to this high NADH-to-NAD ratio, this high reduced state of the mitochondria. So that is just a part of the natural breaking mechanism that happens to make sure that when we're burning fats, we're doing it slowly, and we produce a lot of reactive oxygen species, which also slows this down. What it'll often do is, because of the potential damage here, the potential lipid peroxidation and all the other DNA damage that happens as a result of this is then eventually, you'll induce things like uncoupling, which will fully stop our ATP production. So, we've got a number of these different mechanisms that basically are signals.

It's telling our body that when we're burning fats, we need to slow everything down. We need to slow our metabolic rate, and we're going to be producing a lot more of these reactive oxygen species. We're going to be slowing things down at the electron transport chain. And as we're discussing, this is not ideal if energy is the currency of our health, if that's what allows us to function and get us out of this constant stress state. The main thing that's going to oppose cortisol, get our thyroid up, get our reproductive activity up, get our digestion up, liver health, all of those things, we don't want to be relying on fat burning again, outside of those cases where we really don't want much energy, like a muscle at rest.

But when we're talking about the tissues that need it, we need that energy. And so that's where, that's the crux of this difference between the carbon fat burning. And then as you mentioned, we have the CO₂, the cherry on top. Although it's really just as much of importance as all these others because it protects against the oxidative stress, so to speak, or reductive stress, as well as being the main thing that oxygenates the cell, which keeps respiration going faster. Again, that's another breaking mechanism, is the cell will take up less oxygen because it's producing less CO₂ which it needs for that uptake of oxygen itself. So yeah, that's unfortunately – I was in the low-carb sphere as well and got hooked on the idea that sugar burning is the one that's the unhealthy fuel and produces all the oxidative stress and everything, but totally missing what's actually going on.

Dr. Joseph Mercola:

It's all backwards. It's all backwards.

Jay Feldman:

Yeah, it's all backwards.

Dr. Joseph Mercola:

And that was a very excellent description metabolically. You really understand the science very well, so thank you for sharing that. That was excellent. And so basically, when you shift to burning fat or oxidizing fat in the mitochondria, that's a metabolic inhibitor, and you can really throttle back your thyroid gland. And, of course, the conventional approach or even the natural medicine approach is to use thyroid supplements. Now, if you're a conventional medical doctor – this is actually one of the ways you differentiate between a conventional medical doctor and a natural medical doctor, is the type of thyroid hormone they're prescribing. So, they would prescribe Synthroid or just thyroxine, no Cytomel at all, or natural desiccated thyroid. But that's not the solution, which is [what] I love with your work because actually you did a whole series earlier this year with Mike. I think it was three or four hours.

I mean, it was the most exhaustive, comprehensive review of how to assess thyroid function. So, thank you for that. It is absolutely terrific. If you have a thyroid issue, I highly recommend reviewing that. But the end result, and I can shortcut the four hours watching it, is that thyroid hormone is not the first step. That is not how you treat thyroid. You've got to fix the problem at a foundational level, and you don't want to be burning fat as your primary fuel because that's definitely, as you so well stated, going to slow things down. And then I suspect, I've implied from listening to your podcast, that the single most important reason why you find to address in the foundational cause of people with thyroid dysfunction is they're not eating enough fuel. And actually, this is a good point too. You differentiate between the term fuel and energy. So maybe go in there and address the thyroid issue with respect to not getting enough calories. I mean, they're actually below the minimum required to sustain their weight [in] many people. Is that your experience in treating people with this issue?

Jay Feldman:

Absolutely. Absolutely. And it's really tragic because I think the number one worst thing we can do, maybe we can debate, I don't know whether it's linoleic acid or undereating. It's a hard one.

Dr. Joseph Mercola:

Combo. I'll tell you what's even worse than both those: undereating with primarily linoleic acid.

Jay Feldman:

Definitely. And that's probably the case in most situations. Yeah. So, we were talking about this on the mitochondria, and what happens is that lack of energy triggers the stress hormones. These are the main signals that start us off, whether our blood sugar drops or we have low energy, whatever it is. And these stress hormones tell our body, “Hey, we've got an emergency right now. Long-term, if this continues, we're going to have to slow things down.” And they do that by then regulating things at the thyroid, decreasing thyroid hormone production and conversion, decreasing testosterone production [and] a number of other factors. I mean, we know the havoc that cortisol wreaks and the glucocorticoids wreak. And so, when we – coming back to the – well, I guess there are two questions here. So, one is the thyroid side, as you were saying, that is just a response to a state where we're in a lack of energy.

It's the main metabolic regulator, the main thing determining our metabolic rate. And it will turn down, which is great because if we need to survive when we're starving, we want low thyroid activity, but it's going to come at a cost of our health. And that's not ideal for us on the individual level, or community or species level, or anything like that. So that's part one. But as you were saying, when it comes to the things affecting how much energy we produce, we can talk about carbs versus fat, we can talk about nutrients, we can talk about endotoxin, but if there's not enough fuel coming in, we're never going to have enough energy. We're going to trigger stress. That's how we're going to have to get our energy.

And that fuel coming in is calories – or we can call it calories, it's carbs, fats, protein and mostly the carbs and fats that are going to be used as fuel. And it's a really important distinction because when we call calories energy, when we call these macronutrients energy, we're ignoring everything that goes into the conversion from them to energy. And what that leads to is this idea that when we're gaining weight or when we're overweight, that is from consuming too many calories, too much energy. But the actual problem is we're consuming maybe a normal amount of fuel, of calories, but we're not able to convert it to energy. So, then we end up storing it as body fat. And this is really great news because what it means is that the “eat less, exercise more” narrative, the idea that when we're having an issue when we're overweight, we just need to eat less, is totally missing the point. Totally missing what the actual problem is, which is that we're not using the fuel that's coming in.

And that's probably because the type of fuel coming in might be high in linoleic acid and PUFA. It might have a number of different issues, but the problem is not how much we're eating. And when we undereat – and I was totally a victim of this, I underate for a very long time. And again, as I was saying, I think this was the worst thing I could have ever done for my health. And so many people who I'm working with, again, who come to me are definitely undereating. It is guaranteeing that we're going to turn down our thyroid, we're going to turn down our reproductive hormones, we're going to be in a constant stress state, and that's going to lead to degradation of muscle, of bone, of organ function. It's a guaranteed way to cause problems. And instead, the good news is we can eat ideally even more than we're “supposed to,” even more than we want to based on our estimated calorie expenditure.

And if we're converting it really well to energy, we can still be losing body fat because that will still have fat release from the fat stores without storing anything because we're converting it all to energy. And that also means we can have repair of the degenerated areas. It means we can upregulate our reproductive function, we can upregulate our cognitive function, we can upregulate our digestive function. Everything is dependent on this energy. So, if we can fix that problem and get to a point where we're eating an extra 500, 1,000, 1,500 calories from where we were before and maintain our weight, that's a huge win right there. And so, in talking about this in a practical sense, when I'm working with somebody who wants to lose weight, as much as possible, and I know this is difficult often mentally, but I'd always like to have the weight loss be a secondary goal or a goal that we address later.

Because if we can get you to a point where you're eating an extra 500 or 1,000 calories and maintaining your weight, that will often naturally lead to weight loss. Because what that's going to mean long-term is we're turning down our stress hormones, we're turning up our thyroid – and the stress hormones cause weight gain, by the way; cortisol causes the deposition of fat in the fat

stores – we're turning up testosterone or progesterone depending on men or women, and those things will naturally lead to weight loss without needing to restrict, without needing to cut the calories and without having the constant hunger and cravings that we're told that we just have to live with in order to lose weight. I mean, that's the sentence, right? We're supposed to spend our whole lives restricting and hungry in order to lose weight. And the reality, the beautiful reality is it doesn't actually have to be that way. But it requires that we consider what's going on, what's impairing the conversion from the fuel that's coming into energy and fixing that, so that way we can have enough food, we're not having the constant hunger and cravings, and we can have the weight loss too, and the improvements in insulin sensitivity and all of the benefits that come with it.

Dr. Joseph Mercola:

Yeah, that is the really, really good news because you get to eat, you get to enjoy life. You don't have to deprive yourself in an effort to achieve and attain the ideal weight. And it's such massive confusion around this. And to this day, the mantra of conventional medicine, it's all about the calories. Calories in, calories out. Nothing could be further from the truth. It's your ability to process those calories and convert it into fuel and generate energy, cellular energy. So, you're doing such a great job on that. And maybe you can give us some ranges, typically, that you find that – with understanding that it's not about the calories, but the calories are a good barometer, a gauge of the amount of fuel, potential fuel that you can convert to energy. So, what is a typical scenario [in] people you see or have seen they're coming in with? Are they eating like 2,000 calories and they need 2,500 or 3,000? And maybe give the ranges for women and men with respect to typical, you know, they're a typical woman, 5'7", 5'8", and a man of 5'10", 6-foot, and how many calories they would need with normal activity?

Jay Feldman:

Sure. And as you said, calories are not a perfect measure, but it's the only measure we have or the most accurate measure we have for the amount of fuel that's coming in, the amount of potential energy that's coming in. So, it's a helpful one to use. I will say that when I was low-carb and fasting, I decreased my metabolic rate so much that I was getting by at around 2,400 calories a day at right around the same body weight that I am now when I'm eating 4,000 more or less.

Dr. Joseph Mercola:

How much do you weigh now?

Jay Feldman:

Like 182, 183 [pounds].

Dr. Joseph Mercola:

Oh, geez. We're like within a pound of each other.

Jay Feldman:

So, and that was-

Dr. Joseph Mercola:

You're 4,000 calories?

Jay Feldman:

Yeah, somewhere in – maybe the high 3,000s to around 4,000.

Dr. Joseph Mercola:

Wow. And are you training a lot with exercise?

Jay Feldman:

About twice a week. Once a week will be kickboxing, Muay Thai, MMA (mixed martial arts), and once will be some weight training. Other than that, I'm walking and I'm moving, but I'm not doing structured workouts.

Dr. Joseph Mercola:

Wow. 4,000 calories. Okay, good. All right, so I'm sorry to interrupt you. Go ahead.

Jay Feldman:

No problem. And I will say, just for reference, for people who are coming in low calorie, sometimes a bit of weight gain will happen and that's okay, but it will come back down. And I saw that with myself. I didn't stay at 183, 185 [pounds]. I shot up for a period of time and eventually came back down. And I've seen that with a number of clients. As I was saying, the goal is [to] bump those calories up and increase your metabolic rate. Maybe we're gaining a little bit of weight alongside that, but less than the regain that we always get with the yo-yo dieting and all of that. And it will then come down later on. And when it does come down, it won't be because we're restricting, it won't be because we're spending hours at the gym every day. It'll be because we're improving our health and the weight will come down as a byproduct.

So, what I was kind of getting at there is, our ideal amount of calories can totally vary based on where we're at in our metabolic state and how old we are and how active we are. So, in general, it's very hard to throw specific numbers. I do think as a starting place, just to get an idea, if you use any of the typical calorie formulas or if you use your Apple Watch or Fitbit or whatever it is that you use, have it tell you what it estimates your calories to be. And I would say that's a minimum that we want to get to as a starting place. We'll probably want to go above that. But if you're under that and you're gaining weight or maintaining your weight, that's a sign that your metabolic rate's pretty low. So, I think for most people, that's an easy way to start.

And you can plug in your weight and height and age and activity level, and it gives you a rough estimate. And I would say just start with that as an ideal starting point, minimum point. Most

people are eating below that. And then work your way up, but don't force it. Just use your hunger cues and your cravings and intuition in those ways. And as I was saying at the start, the slower and more carefully we go, the less likely we are to have to kind of go off the path or have negative symptoms or gain weight. A little bit of that might happen here and there, and that's okay as long as we're still noticing other health benefits along the way, but it's something we want to be careful about. I wouldn't recommend that anybody jumps in by adding 1,500 calories a day to their current diet in the vast majority of cases because I think there will be some rebound weight gain.

I will throw the caveat in there. For some people, that's worth it. For some people, and I guess I was in this camp, they had restricted so heavily, had been undereating for so long that they're okay with gaining 5, 10, 15 pounds and going through the kind of refeeding phase, knowing that they're going to feel way better during that time and eventually that weight will come back down. Sometimes that's easier and better for the individual than going slow and steady. So, we have to take it on an individual basis. But there was a great study, a great paper, a pretty large study, which was the Minnesota Starvation Experiment, where they kind of looked at what happens when we go low calorie for a while and then what the refeeding is like. And so, just as a starting place, this was young men in their 20s and the average weight was about 150 pounds.

And as a starting place, they were eating about 3,300 calories a day. That was their maintenance going into the study. So, for one, that just tells us how much things have changed. This study was from 50 plus years ago, about 70 years ago I think. And so, we can see how much metabolic rates have changed from then until now. You don't see very many 150-pound people, even men in their 20s eating 3,300 calories a day. But anyway, so that was going into the study. They then put these participants on an 1,800-calorie a day diet, and this was trying to test what was happening during – I believe it was World War II, trying to see what was going on as a result of the rationing diets. And so, they put them on 1,800 calories, and if you read the reports of what these people experienced, I mean it was astounding.

They were dysfunctional, they couldn't open doors, they couldn't focus in classes. A couple had to be taken out of the study because they were eating chewing gum and stealing food out of garbage cans. One in particular stole, I think, from a store raw rutabagas and was eating raw rutabagas. So, these people were totally dysfunctional, and this was only for several months. It wasn't like they were on this for an extended period of time, and this was an 1,800-calorie a day diet, which so many people are surviving on right now and don't even realize how much it's affecting them. But so, mood-wise, physically, there was no libido, they would talk about how they would watch movies, they would go to the movies with their significant other maybe, or just on their own and they had no interest in anything other than the food. There would be sex scenes, love scenes, and they had no interest at all.

It was just only anytime they would see food, that was all they would remember. They would have nightmares and all sorts of things. So anyway, this was obviously severely, severely affecting them. And then they tried refeeding them, and so they put them on something like a 2,300-calorie diet, a 2,500-calorie diet [and] a 3,000-calorie diet. And they had to increase all of them back up to, I think, it was like 3,500 calories because they weren't recovering quick enough at the small increases that they had. And for some of them, their recovery from this semi-starvation, which was again, I believe six months, the recovery from that six-month period took

as long as two years. And when some of them, they had refed at the 3,500-calorie level or so, I think it was for a couple months. Some of them, when they got out of the study, they ate so much after that point that they had to go to the hospital and get their stomachs pumped. They were eating 10,000 calories a day.

So, the refeeding is real. And what happened in all these individuals, again, sometimes it took as long as two years, sometimes it was less. Most of them regained a good amount of weight, but by the end, they'd all gotten back to their baseline weight when they had started. And so, I think this is, if we can extrapolate this out and compare this to what so many people experience and have experienced for decades, and I was one of these people who experienced this for many years, severe undereating, and sometimes when you're in that situation, refeeding a little quicker is worth it considering what we've put ourselves through and the severe energy deficit we've put ourselves through. But again, there might be some weight gain in the meantime there. So, everyone has to evaluate on the individual level what makes the most sense for them.

Dr. Joseph Mercola:

That's great. So, that's interesting. Now for people to start on this, it seems from my perspective that the first step is to calculate how much protein you need, because you need a baseline protein. And that pretty much is consistent for everyone. And I love your recommendation and Mike's of 0.6 to 0.8 grams of protein per pound of body weight, and I'm assuming that's lean body mass, right? Or do you just take the total body weight?

Jay Feldman:

In the studies looking at this, they were looking at total body weight, but I would do this assuming you're at your goal body weight. There's still some fat mass there. We're not ignoring all the fat mass because that was what the studies were based on. But if someone's largely overweight, it will skew the value. So, I would say ideal body weight, 0.6 to 0.8 grams of ideal body weight.

Dr. Joseph Mercola:

Okay, good. So anyway, you've made that calculation and if you're going to eat the right amount of calories, it's probably about 15% of your total calories would be protein, and it's got to be the right protein. And we're not going to go into the details of that here or now, but you get that number down first and you prioritize it. And you want, typically, a minimum of 20 to 30 grams at a meal divided equally a few hours apart just to make sure that you can get that stimulus to mTOR. But then how do you advise distributing the calories between the – because there's only two other macronutrients left, fat and carbs. Especially if you're coming from low-carb, you're going to be like 5%, 10%. So typically, the low-carb diet is like 70% to 80% fat, and so I think you're recommending 30% to 40% fat and the rest is carbs.

Jay Feldman:

So, my current recommendation on the fat side would be the endpoint we would want is 20% to 40% fat, and I would lean toward that lower 20% if somebody has less muscle mass, is less

active, or is more overweight and has more body fat. And the reason for that is a couple-fold. One, there's going to be less of a need for fat. So, the idea with fat is we're trying to get as much as we need. We don't want to go too low because too low will cause issues with digestion and hormones. So, we have necessary amounts there. And the other is going to be how much we're using for fuel. So, if we're pretty active and we have a lot of muscle mass, those fat needs will be higher. So, if we're on the low end there and we have more body fat, we'll already be releasing more body fat as well, so our fat intake needs aren't as high. And so that would be a case where lower on the spectrum of around 20% tends to be more helpful.

It can be more helpful for insulin sensitivity when someone's struggling with that. So that's certainly another thing to manipulate. We mentioned the B vitamins before, but decreasing the fat can certainly help in that sort of instance to improve our insulin sensitivity. So that would be the low end there. And then on the high end, 30% to 40% would be more for someone who's leaner, has more muscle mass and who's more active. And so yeah, that would be the higher end of the range. And then we kind of flip that with carbs. So, the carbs can really be, again, anywhere from 40% to 60%, if we're opposing that with the fat. And so, it would be on the higher end of that carb range if your fat is lower and on the lower end of that carb range if your fat is higher, just kind of adjusting it as you said, protein first and then looking at fat can be the next most helpful one. And then carbohydrates last will, I guess you could say, fill in.

Dr. Joseph Mercola:

Fill in.

Jay Feldman:

But we really want to get the amount that we need. So that's a helpful context there. But what I will say is if someone's coming from 80% fat, 20% protein, and they're starting with insulin resistance and things, we don't want [to] jump to 20% fat, 60% carbs and 20% protein. That jump will not go too well. So, what we were talking about there is of those macronutrient ranges is kind of the endpoint, but if someone's starting at super high fat, if they're at 20% protein, 80% fat, 0% carbs, the next step might be 10% carbs and 70% fat, and then 15% carbs or 20% carbs and 60% fat. How quickly we go through that, as we said, is going to be individual. It'll depend on how someone's responding and how they feel. Some people, they're going to jump, right? I jumped from cyclical keto into higher carb. Again, jump is relative. It wasn't the next day, it was over weeks. But it depends on the individual's circumstances. But we do want to transition to that. We don't want to go immediately there because all of the carbohydrate machinery, so to speak, the things that increase carbohydrate utilization is turned down when we're on a low-carb diet. And that also includes [the] thyroid. It also includes looking at levels of stress hormones and all of that.

Dr. Joseph Mercola:

Well, good. Thank you for those parameters. So, I wanted to share my personal experience, which completely validated this approach. [It] was biologically correct, at least for me, and it was certainly worth exploring and diving deeper and sharing it with other people. So, I was in pretty good shape, at least I thought I was, and I thought I had more muscle mass. And I weighed

about 190 [pounds] and I had 15% body fat. This is by InBody, which is probably the best bio-impedance analysis out there, and pretty comparable, if not almost identical to DEXA scan, which you don't want to do because it's ionizing radiation. But DEXA is pretty well documented to be fairly accurate. So anyway, the InBody was 15% when I adopted this. Now, I had 70% fat intake, but the interesting thing about my fat intake, it was probably less than 3% PUFA, less than 3% which is rare, which is an anomaly.

Very few people are doing that low. So, it's mostly all saturated monos. So that's the problem with the high-fat diet, is that you're getting so much PUFA in the diet, which is really devastating in the long-term. But anyway, I made the transition. Lots of watermelon in the morning and radically increased my carbs. I lost 10 pounds of weight, 10 pounds within a month or two. My fasting blood sugar went down by 10 points, and I had this persistently high – Not really high. Anything under 1 for high-sensitivity CRP, C-reactive protein, which is considered one of the best barometers of inflammation, is considered normal. But mine was 0.7, 0.8. I couldn't get it down to below 0.2, which is where I wanted it to be. It went down to 0.2 once I did that. And there was another – oh, this was really interesting. I had this anemia because I had so much fuel and it was using so much energy.

I've got a genetic anemia called thalassemia, which essentially gives me – it looks like iron deficiency anemia, but it's not. It's inability to make one of the beta – the hemoglobin chains, so you get really tiny red blood cells and a lot of them. Well, as a result, I've always been anemic. Hemoglobin's typically below 12, but my hemoglobin shot to 14 and my iron level, the ferritin level, dropped dramatically because I was actually – my body was able to make a lot more red blood cells. Now, that kind of reverted back since then, but I thought it was just absolutely fascinating that that happened. It was just astonishing, actually, that you could have that dramatic a change, because I had it my whole life, and all of a sudden it changed. What was the other thing? There were probably one or two other variables, but to me that was just solid proof that this was the right way to go, and I'm just so happy I learned about it and finally embraced what Peat was teaching and adopted it because it was so valuable.

Jay Feldman:

Yeah, yeah, absolutely. I saw very similar shifts. I'd never looked at things like CRP, but for one, my LDL (low-density lipoprotein) dropped 100 points, or not LDL, my total cholesterol dropped 100 points, mostly from LDL. Saw big shifts in TSH (thyroid-stimulating hormone) coming down and improvements in thyroid. I, unfortunately, don't have as many before and after tests because this was quite a while back, and as you said, I was in college and 19 at the time.

Dr. Joseph Mercola:

Yeah, you weren't an avid biohacker at the time, but you were an early adopter for sure. So, one of the things, maybe we – there's so many places we can go, but I've had over 40 years of long-distance running, and I'm glad I did that rather than starting with resistance training, because I've learned recently that if you do excess resistance training, it's really dangerous, really dangerous because you're just pushing way too hard and it actually decreases your life expectancy. Where[as] long-term endurance exercise doesn't do that, and you still get some benefit. It's not as much. The best is just simple movement or walking. I mean, that is the ultimate, and you're

doing it. You embrace it, you get it. You understand that, just the movement. And you don't need a lot of resistance training. But for those that are doing it, one of the podcasts I was listening to where you discussed this, which is really a fascinating observation, is that once you get your cellular energy up and you dial these in, you can get the same benefit with a fraction of the exercise.

Because people are trying to gain muscle mass because it's important. You don't want to have sarcopenia. You don't want to be frail when you're elderly. So, you go to the gym and hit the resistance training, but if you're not able to have the cellular energy to convert that signal into muscle mass, it's all useless almost. It's a waste of time, effort and energy, and may be highly counterproductive to me. You can comment on that, because it was really mind-blowing. It was so obvious when you stated that. Yeah, you have to have cellular energy, otherwise it doesn't work. You cannot create muscle.

Jay Feldman:

Yeah, and all the signals – Muscle is, as important as it is, if we're trying to survive through a famine, it's not all that important. Surviving is more important and our brains are more important. Even though we'll turn down the function there, we don't want to be degrading in those more important organs. We will degrade our muscles first for sure. And we see that as well. Even some of these recent fasting studies where when they compare an intermittent fasting group in humans versus a regular group and they're both in a calorie deficit, the fasting group loses a lot more lean body mass, a lot more muscle mass because of the stress. And it's very similar to what happens when we're avoiding carbohydrates. Yeah. So, I experienced that myself, for sure.

I was someone who had been working out for a long time at that point, and with building muscle being really the main goal as well as building strength – and those things shot up with the same stimulus after bringing the carbs and calories up, which I think to somebody who is maybe a bodybuilder, they're like, “Yeah, of course you're not going to gain muscle when you're in a cut,” so to speak. But so many of us, when we were in the low-carb space, we didn't put those things together. So, all of the signals when we're on a low-carb diet encourage us to be catabolizing our muscles. High levels of glucagon adrenaline and cortisol, low levels of T3, low levels of testosterone, which sometimes take longer to show up but often do — those things are not going to be conducive to building muscle. And then as you mentioned, while we need protein as a building block, we need energy to build with the building blocks.

And I think that's so often ignored. Even some of the people currently who are recognizing that there's some cost to fasting for lean body mass, they're suggesting that it's just because of a lack of protein, but it's not. It's because of the lack of energy and the hormonal signals as a result of that, that are preventing us from using energy to actually build the muscle and build the strength. So that's absolutely key. And I think, as you were saying, the amount of stimulus we need to build muscle goes down considerably when we have enough energy on board, when we're in a really well-fueled state, high-nutrient state and high, essentially, anabolic state.

Dr. Joseph Mercola:

So, I'm wondering if you [can] give us feedback with respect to the people you're seeing, the men specifically that have been on low-carb. What percentage do you find have low testosterone? And the answer to low testosterone is not taking testosterone hormone replacement therapy at all in any way, shape or form. That is probably the last thing you want to do.

Jay Feldman:

Yeah, a good number. Of course, there is a little bit of a selection bias, where the people who are coming to me are looking for help, so they're more likely to see those things. But percentage-wise, definitely a majority, definitely over 50%.

Dr. Joseph Mercola:

Wow. So, it is the majority. What type of levels are you seeing?

Jay Feldman:

Talking sub-500. Sometimes lower, but talking sub-500 there.

Dr. Joseph Mercola:

Okay.

Jay Feldman:

Yeah. And this is a natural product of a semi-starvation state or a starvation state of a low-carb state that mimics starvation. Testosterone and reproduction, not only are they not important when we're starving, but they're intentionally downregulated because that is energy that we can't expend in that scenario. And so, as you were saying, the solution there is not just to throw testosterone on top because – and this is, I think, another misconception there, is that when we throw on hormones, if we try to get off later, there'll be even lower. We're going to just downregulate all the processes. That will happen if you don't fix the underlying state and you just throw testosterone on top. What you're going to be doing essentially is, what you're telling your body, you're giving it a signal that says, “We actually still want to prioritize reproduction and muscle even though we're in a low energy state.”

And that has to come from somewhere. So, what that means is you're inherently downregulating or deprioritizing other tissues – liver, kidney, brain, digestion – and forcing the prioritization of reproduction and muscle mass. You don't want to do that in a low-energy state. If your only goal is what you look like and aesthetics, without any concern for health, then maybe, but, I think that's-

Dr. Joseph Mercola:

I like that.

Jay Feldman:

Right. Right. But instead, what we want to do is look at what has led to the low testosterone in the first place, reverse that state, which essentially comes down to energy. And we see it even – You zoom in in any area and you see this, so you zoom into the testicles, the cells that are the lactic cells, the production of testosterone. If there's not enough ATP there, they won't be producing testosterone. If there are issues with the electron transport chain, they won't be producing testosterone. If you don't have enough T3 there, you won't be producing testosterone, because T3 moves the cholesterol into the place in the mitochondria to convert it to pregnenolone and the other steroids. So, all of the big picture things that increase our metabolic rate will increase testosterone.

And on the flip side, if you have cortisol there, you're not going to be producing testosterone. It's a negative, it has an inhibition there. So, what we don't want to do is just zoom into the testicle and they say, “Well, how do we fix that?” We want to look at the big picture and say, “Well, how do we get out of a constant stress state?” And the biggest thing is producing energy, and how do we do that? It's getting enough carbohydrates and fats and protein, getting enough nutrients, looking at sufficiency there and what is optimal to have. And then make sure that we're converting it well. Lowering endotoxin, making sure we're getting enough sunlight, making sure we're getting enough sleep, making sure we're getting nutrients, supporting our hormonal state.

And in the process of doing that, I think it's okay to support a little further with some extra hormones. If someone's really low in thyroid and it's not improving after a good period of time of fixing the foundations, a little bit extra support there can help. And that can increase testosterone. And I'd rather look at thyroid before testosterone, if we're going to supply some hormone. And I'm not saying even testosterone, I'm saying even pregnenolone and DHEA, there's a place for those too. I might look at thyroid first, see how that's looking, and then maybe try pregnenolone and DHEA after. It kind of depends on the individual, but those are also helpful precursors to testosterone that can help provide some support in the meantime. And again, we don't have to be concerned that when we go off of those, our testosterone production is just going to go to the floor.

And I've had people who I've worked with who have been on TRT (testosterone replacement therapy), and we were able to fix the foundations. Initially, they went off TRT and their testosterone came down, but we were able to fix things up during that time where it came back up. I'm talking to nearly a thousand, high above 800s, even though they were on TRT before. So again, that just points to the situation where if we fix the foundations and what was causing low testosterone in the first place, even if we're supporting with pregnenolone, DHEA, thyroid, we can still restore that ability to produce testosterone.

And the same thing applies to thyroid as well. If we're using a bit of T3 or desiccated thyroid, whatever it is, we don't have to worry about the thyroid being downregulated. It'll happen short-term, but as long as the right signals are there and the wrong signals aren't, as long as glucagon, adrenaline [and] cortisol are kept low, and energy is high, or [in] a solid energetic state and our livers have glycogen and all of that, the thyroid hormone production will come back. It's just a matter of supporting us to get there and using some support like the thyroid hormones, pregnenolone [and] DHEA, after the foundations are in place, can help us get to that point. So yeah, multifactorial approach, but totally doable.

Dr. Joseph Mercola:

This is so logical, the way you explain it. It's so obvious. Yet, there are people in a low-carb space that I can think of – and I'll name him. It's Dom d'Agostino, who's a really brilliant research scientist, and actually is based out of University of [South] Florida in Tampa, and does great work. And he's a big promoter of [a] low-carb diet, and not necessarily ketosis, although he recommends it therapeutically. He's also a bodybuilder, and I think he's dead-lifted 700 pounds, 800 pounds. He's been bodybuilding most of his life, yet his testosterone level – I heard him on a podcast recently, I was surprised, it was like 300. And he was explaining he believed that it's normal for your testosterone to decrease as you age. I said, "Dom, Dom." I'm tempted to communicate with him and I think he'd be open to it, because he's not a dogmatic guy. He seems to be pretty open in general. I really like him as a person, but he doesn't understand this testosterone.

Jay Feldman:

Yeah. And there are a number of ketone carnivore advocates that I've seen who have mentioned that they have low testosterone, but they've got the muscle mass, so it's got to be okay. But yeah, Dom is great. I had a friendly debate with him. We did a two-part debate where we discussed some of these things.

Dr. Joseph Mercola:

I think that's where he mentioned it. That's why I saw it because you had a discussion with him. That's where he mentioned that his testosterone was 300.

Jay Feldman:

Yeah. And of course, we had some disagreements. Didn't really come together on everything. Although I do think it's important to mention, and I don't want to – Watch the interview, so I'm not taking this all out of context, but one of the first things he started with is that he does not suggest a ketogenic diet as a health diet. His only suggestion for it is in certain disease states like epilepsy – which even then, I think, what we're looking at there is a carb metabolism problem, high lactate, [a] number of other things that suggest that if we fixed carbon metabolism, we might be able to resolve the issue without needing to go to a ketogenic diet, but that's a separate question. But in any case, yeah, that was one of the first things he said was that he's not suggesting this as a health diet.

Dr. Joseph Mercola:

That's a switch with him, but it was a really healthy move in the right direction. It shows his flexibility and openness. So, do you think that there's ever – Clearly, you can't discount the fact that people have improved from doing keto. And you alluded earlier to some of the reasons why that is, typically because of endotoxin and lowering the fuel to feed those bacteria and produce it. But do you ever think that there's an indication to start on that to regain insulin sensitivity? Or you just think that it's just a totally wrong direction and it would be far safer to go along the lines that we discussed earlier?

Jay Feldman:

So, if we are choosing between continuing to do what the individual is doing or going to keto or carnivore, keto or carnivore are probably a better place to go, right? And you mentioned endotoxin is one main reason, and we see this borne out in the research, too. Another reason is poor glucose metabolism, insulin resistance. If someone's insulin-resistant, they're not using the carbs coming in, and if they're not going to fix it, then sure, we might as well avoid them for that period of time. But I would say the better route is to work on fixing it. And in the vast majority of cases, the people who are in that state are not coming from a whole food, fruit, root vegetables, low-PUFA protein sources, low-PUFA fat sources type of diet, and experiencing what they've experienced in the vast majority of cases.

So, my suggestion would be, just go do that. We don't even have to over complicate it. Let's not avoid carbs, let's not avoid all non-animal products. Let's include those things, but just shift toward whole food, low-PUFA, easily digestible foods, away from the grains. For the vast majority of people, that gets them to where they need to go without needing something as restrictive and inherently stressful as keto and carnivore. If that is the only way for someone to move forward, if it's that or sticking with what they're doing, then yeah, do it. Do keto or carnivore. There is an inherent long-term negative to it. There's inherent stress that comes with it. I'd never think it's the optimal route, so to speak. But if that is the route that someone needs to go to make a change, then I think it's fine to start there. I would just say let's not stick with that long-term.

I'd really prefer to shift to including healthy carbohydrates as soon as possible. And that's because whether the stress is for three months or a year, it's always going to be a negative. And what happens is we have these major benefits from reducing the endotoxin and these major benefits from relief from throwing carbs into an insulin-resistant state. But those benefits will – once you've attained those benefits, the negatives will start to creep in as being overpowering at some point. And I'd rather get all of those benefits without the negatives. I'd rather lower endotoxin by taking out grains and any sorts of other raw vegetables, raw leafy greens, those kinds of things. Lowering fiber if we need to, but keeping carbohydrates so we can avoid the stress. I'd way rather get that benefit in that way as opposed to just taking out all carbohydrates.

Dr. Joseph Mercola:

Excellent answer. So, I want to go back to your biography a bit at this point, because my intro was so long, I neglected to include some points that I wanted to mention. And one is that – I'm careful when I recommend someone – and I've watched maybe 70 hours of your podcast. And what's really unusual is that you have no formal medical training, yet I have not heard one thing that I would disagree with what you said. I don't know how you acquired your knowledge, but you're really sharp. And we had a discussion earlier before about bringing you on the podcast, and we talked about – Or you mentioned that many of your friends had chosen to go to medical school and are now just finishing their residency – Because you're still young. You're under 30, right?

Jay Feldman:

Yeah, 28.

Dr. Joseph Mercola:

28, which is about the age you would be finishing your medical training depending on which specialty you took. And you could have went to medical school and you were tempted to, but you consciously chose not to. And I think that is probably the smartest decision someone with your skillset could possibly make because – And it got me to thinking, because literally if you're smart and you're intelligent and you really understand health at its fundamental level and you're not a servant for the drug industry, you're just going to be frustrated beyond belief, and you're going to be an indebted servant to the system. You're going to come out with a half a million dollars in debt and you'll be restricted.

And we can see this with what happened with physicians who understood COVID, guys like Pierre Kory and Peter McCullough, who are board certified in subspecialty, and their board certifications are removed, which essentially makes it illegal for them to practice because they have no insurance coverage and they can't get on staff at any hospital. So essentially you are their servant and slave, and if you don't follow the party line to the T, they'll cut your legs up from money. You won't be able to earn a living. You have this huge debt and you won't be able to pay it back. So, congratulations on you for figuring that out in an early stage. You figured out long before COVID hit, but you saw the writing on the wall and that is important. But some people may be concerned that you don't have the formalized training. I just don't think it's an issue.

The issue is what you know, what you understand, and anyone who's listened to this conversation we've had can understand your understanding of this is at a profoundly deep level. What I love about you is that you explain it in details that are easy to understand. Georgi explains it differently, and I love, as I said earlier, I love his deep diving into molecular biology. It's not that you don't know the molecular biology, as evidenced by your sharing of the differences between fat and sugar conversion in the mitochondria. But you choose to just simplify it so the average person can understand it. And more importantly, once they have that understanding, they can apply what they need to do to make the changes in their life. And I want to congratulate you on doing that and really serving an important role.

As I said, I'm so excited to have your resources. I don't have to make a hundred hours of video like you already did to share this from base one, because I don't have the time to do that. And I'm just beyond delighted that you exist and you've made the commitment and dedication, and you made a smart move. So, I don't know if there was anything else I wanted to say. I just wanted to make sure I got that in there because I'm really impressed with you as an individual and a person, and what you've been able to put together in a way. I don't know anyone else there that is – There probably are, and I just am unaware of it, but I don't know personally anyone who's doing what you're doing in the Ray Peat space to educating the community at a fundamental level that they need to understand it. So, thank you.

Jay Feldman:

Well, thank you, thank you, thank you so much. And it's thanks to you and others like you that I was able to feel confident, or at least confident enough in that decision not to go to medical

school and to realize how that would hold me back. And so yeah, I'm glad that I did that and I'm very thankful for that. And you mentioned something that I think gets at a more important topic than anything we could talk about in terms of biochemistry or nutrition or anything else. And you were bringing up concern. What if somebody is concerned that I'm not an M.D. or about my lack of credentials by mainstream standards, and is skeptical? And I would encourage that. I think one of the most important things that we can do, as we've experienced in these last few years as we've come to terms with the lack of this, is think critically and be skeptical, and think for ourselves, and learn to the extent that we can, try to understand to the extent that we can, and also value our own experience.

Value what happens when we make some sort of change, and try to integrate that in with our picture of what we understand of physiology. That's going to be different for everybody. Everyone can only spend as much time researching and understanding as they can. But I would really encourage that everybody does that. I would encourage you to be skeptical. Don't just take my word for it if you're not – “Yeah, that's great.” Don't do that. Look at the sources that we cite, look at the physiology, challenge it, consider other possibilities. I think that is the best way that we learn. And that's how I've come to the conclusions that I've come to, is by doing those things, challenging previous beliefs that I've held and trying to continue challenging my own beliefs. And so, I'd encourage everyone to do that. And again, we can only do that to whatever extent that we can. So, do it to the extent that you can, and then also value your own experience and experimentation. And I think that's really the only way that we move forward in a larger sense.

Dr. Joseph Mercola:

Yeah, I couldn't agree more. And ultimately, your body is the final arbiter of truth for you, personally. So, try it and see what happens. And if it's not, then it has to be modified because what I love about your approach, it's individualized, it's customized, it's not some – And actually, it's not just your approach, it's most people in the Peat community seem to have that approach. Danny Roddy and Georgi embrace it, too. It's individualized and customized for the person. And Peat was never dogmatic either. He really wasn't. There is no such thing as a Ray Peat diet. He would just provide the principles and the guidelines, and you figure it out yourself, which is great. This is the way it should be.

So, your pockets are really good. The only thing that I want to warn people somewhat of, if you're using – And I encourage you, and hopefully you're in the process of taking your content to different platforms that you can continue. It's currently on YouTube, but you've got to have an alternate platform. Because I think eventually they're going to take you out. There's no way this information is going to be allowed to exist because it competes too much with the traditional conventional model, you're going to be deplatformed. Not this year probably, but down the road. It's just inevitable. That's the way they're going. It's just more and more censorship.

In the current YouTube format, you cite many studies in most of your podcasts and you have a really good page on your site, that's not [in] the YouTube page, but you have to really – It's not obvious where it is. You have to go into the more details on the YouTube description. And then there's a link at the very bottom, I believe, typically, that goes to your website that has all the resources that you need. And those resources are important, especially if you want to go do a

deep dive on it and all the studies that you quoted there. And it's really easy to find it. It's laid out really beautifully, but just caution people that it's not the easiest thing to find, but it's there.

Jay Feldman:

Sure. Yeah. And if someone goes to my website, JayFeldmanWellness.com/podcast, it has a list of all the episodes, and you can find the episode, click on it, and it'll have the show notes and the studies that we link to. So, they can also find it from there, or as you said, there's a link in the description on the YouTube or podcast platform.

Dr. Joseph Mercola:

I just wanted to highlight this. This is a really important resource, especially if it's confusing to you initially, that to actually see the show notes and the studies and look at them, it'll really help you quite a bit. So, great resource. I just can't thank you enough. You've made my job and life so much easier. It is so good. I guess I'm just so excited that you exist as a resource for people. So again, I think it would be – Unless you're really, ideally, optimally healthy, and the odds are that it's pretty unlikely if you've been following me because I've been teaching the low-carb for so long that I probably confuse most people, and I apologize for that. I was doing the best I could. But I more than compensated for it by finding a resource like Jay. I would strongly encourage, like I said at the beginning of this, to go to podcast number one where he goes through the basics. And we gave you the 50,000-foot overview here, but he goes into a lot more details in those basics.

And once you start hearing it through the third, fourth, fifth, 10th time, then it'll kick in and you'll understand it, and you'll be able to apply it and, most importantly, reap the benefits, radically reduce your risk for chronic degenerative disease and be healthy and happy, and not have to suffer needlessly because you weren't allowing your body to generate the optimal amount of energy that it can and has the ability to do, because you can repair and reverse just about every illness if you get it soon enough. Sometimes it's too late, and if you're going to be dead of cancer in two or three weeks, it's unfortunate. There is a point of no return. But for most people, they're very far from that point. And your body can repair almost anything, which is, to me, after studying medicine for so long and health, it's really quite extraordinary what you can – The body's capacity to turn things around. So, anything else you'd like to add before we sign off?

Jay Feldman:

Yeah. So just for anyone who's wanting to look at the podcast, it's called the Energy Balance Podcast.

Dr. Joseph Mercola:

We'll put a link. We'll put it on [the] site, too.

Jay Feldman:

Okay, great. There was one thing you mentioned that I have to throw in because I totally missed it earlier, but we were talking about different diets for each individual and individual differences. And I didn't mention dairy as something that, I think, is a really important aspect of the diet for a lot of people, but it is definitely one of these where it really depends on your capacity to be able to digest it, to break down the lactose, whether you have reactivity to the proteins in there, specifically casein is a pretty common one. So, that's a whole other rabbit hole that maybe we can discuss at some point. But again, it can look different, the implementation of the principles, which are the most important thing, the principles. The implementation can look different for different individuals. One person might have a highly dairy-based diet that's lots of milk as their protein source.

For someone else, it might have no milk, and it might be more meat-based for protein. For someone else, it could be 150 grams of carbs and someone else it could be 450 [grams]. So, it totally depends on the individual there, but I had to mention that. But thank you so much for having me. If somebody is looking for a great starting place for understanding these things beyond the podcast, I do have a free mini course called the Energy Balance Mini course. That is a seven-day mini course and walks through how we can adjust our diet and lifestyle to maximize our energy. And that can be found at JayFeldmanWellness.com/energy.

Dr. Joseph Mercola:

And you'll hear an announcement for that on every podcast, too. So, you won't miss that one, but we'll put a link to that, too. But the most important thing is – You can sign up for the mini course, but I really want you to watch all these podcasts because it's a free school. Tuition is only your time, you don't have to pay a penny for it, other than the bandwidth you're using – If you have internet or your phone, you can just watch it. It would be one of the best investments of your time that I think you could do. And as I said, it's going to be integral to the masterclass I'm creating because Peat's work is essential for doing this.

And it's not an easy thing to teach and learn because it's so comprehensive, and there's so many customizations that need to be done, and so many principles that need to be understood to implement it properly. And Jay does a magnificent job of that. So, I can't thank you enough for everything you've done, and your commitment and your wise decision to not go to medical school. That was really spot on. You're going to be rewarded big time for that because you're going to be able to help so many more people than you ever would have been possible had you gone into medical school and just now have been finishing your residency. So, congratulations.

Jay Feldman:

Thank you. Thank you so much. Thank you so much for having me. It's been a pleasure, real honor. So, thank you.

Dr. Joseph Mercola:

All right. Keep up the great work.