THE FAT SUMMIT

Separating Fat From Fiction

Transcript:

Interview with David Ludwig, MD
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Dr. Hyman: Welcome everybody, this is Dr. Mark Hyman. Welcome to the Fat Summit, and today I have one of my favorite humans on the planet, Dr. David Ludwig, also professor at Harvard, who has been one of my main teachers and mentors and is actually one of the main stars of my new book, "Eat Fat, Get Thin." Because, I really am not a scientist, I just read scientist work, and David's work has inspired me the most. And he's really been a pioneer in helping us rethink the idea that all calories are the same, rethink the idea that fat is bad, rethink the idea of how we're taking care of our children in terms of the food policies we have. He's really a pioneer in this world.

He's got an amazing resume that's pretty impressive: Harvard, Stanford, MD, and PHD. He's director of the OWL Weight Loss Clinic at Children's Hospital, one of the largest and oldest weight loss programs. He's really pioneered work on how food is not just calories, but information that regulates your hormones, and metabolism, and body weight, and he developed...really pioneered work on the glycemic load, diet, which is really about how we understand the context of our diet, how it affects our blood sugar.

I first got to know David because I read some of his papers back 15 years ago, and I was, like, "Wow, this is an amazing paper." He took a group of kids and he divided them into three groups. He gave one group an omelet, one group steel-cut oats, and group oatmeal. And he measured their blood, and he looked at what happened to their hunger and it was like the most fascinating study because they were all the same calories. I was like, "Oh my god," even though the food was the same calories it had tremendously different effect, and it sort of blew my mind. And so I was like, "I got to call this guy and talk to him," but who was I? I was, like, a nobody doctor at the time and I call this big professor at Harvard. I'm thinking he's not going to talk to me, but he took my call.

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Dr. Ludwig: I wasn't a professor at the time.

Dr. Hyman: You were an assistant professor.

Dr. Ludwig: Fortunately for both of us.

Dr. Hyman: He was still a big deal, and I was like, "Wow, he took my call," and we became friends. Anytime I really want to know what's going on, I check out David's work. He's an editor at JAMA, the Journal of the American Medical Association.

Dr. Ludwig: A contributing writer.

Dr. Hyman: A contributing writer, but aren't you on the editorial thing somewhere?

Dr. Ludwig: No.

Dr. Hyman: You used to be.

Dr. Ludwig: I write.

Dr. Hyman: Right. He writes all these articles in the Journal.

Dr. Ludwig: Leave the editing to somebody else.

Dr. Hyman: Yeah, but if you're looking for a scientist whose got street cred, just to tell you who David is, he gets asked to give speeches all the time. And he has so much integrity. He doesn't take any money from the food industry. If he

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has to go to Las Vegas to talk to all the food industry people, he'll pay his own flight and he'll pay his own hotel. He won't even take money for a cab fare. He's that guy.

There aren't many of "that guys" in medicine or science, because the whole things corrupted. He's one of the few who's actually asking the hard question, saying the hard things, and doing it in a way that it's just transforming health care. And I'm just so excited to have you as part of this summit, as this conversation, and I'm really excited about your new book that just came out which actually, I just stole a lot of your ideas from your research and I put it in my book. But I'm sure you did a better job, and it's called "Always Hungry," which is why we're always hungry and what to do about it, which we're going to get into in a big way.

So, David, I want to start by just sort of having you sort of start with the end a little bit, and where you got to. Because one of the things that I started explaining who you were about this study that I read about all calories not being the same, has sort of led you to this place that it's not about so much how much we're eating, it's about what we're eating that matters, and that it's not really about counting calories that matters. But it really affects our overall focus to shift their perspective from the "how much," which is what we're all focused on, less calories right, to the "what." How did you come to that and how does that work?

Dr. Ludwig: Well first off, thank you for the incredibly kind introduction Mark, and it's been an honor to know you for I guess these past 15 years or so.

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Dr. Ludwig: Thank you Mark, it's just been an incredible honor and pleasure to know you, and to watch your career skyrocket over the last 10-15 years. And it's a real pleasure to talk to you today. I got my start in nutrition through the backdoor. I trained as a medical student, medical resident, pediatrics and endocrinology, never really taking much in the way of nutrition. As we know, that medical schools...

Dr. Hyman: Have none.

Dr. Ludwig: ...I think having all of four hours dedicated to nutrition in the curriculum, even though diet causes most chronic disease in this country. We spend a lot of time learning about drugs to treat those chronic conditions, not a whole lot about diet. But for me, that was a blessing in disguise because I was never indoctrinated in the standard model of obesity, "calories in, calories out". And in fact began to think about nutrition from the perspective of an endocrinologist, meaning how does food affects our hormones, our metabolism, and the expression of our genes. You've used the term "food is information as much as it is calories."

I began to design studies...well I should say that during the first few years of my career as a pediatric endocrinologist, I was using the standard treatments, a low calorie, low fat diet, to treat children and their parents in our clinic. I early on had gotten interested in obesity and obesity research was focusing on genes and molecular mechanisms. But, while our studies in the basic laboratory were fascinating in revealing underlying biology, we seemed to be using the same approach that had been developed a century ago in the clinic when bloodletting was still in fashion, which is focused on "calories in, calories out."

Dr. Hyman: Eat less, exercise more, right?

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Dr. Ludwig: Yeah, exactly. Eat less, move more. If that worked, we'd all be looking for something different to do during our days. In fact, that approaches...

Dr. Hyman: You and I would have to find another job.

Dr. Ludwig: Yeah, or early retirement Mark.

Dr. Hyman: Okay.

Dr. Ludwig: There's abundant evidence that calorie restricted diets do not lead to long-term weight loss, and with each week a new study emphasizing that low-fat diets, which have been the primary way to reduce calorie intake...If you're interested in lowering calorie intake, you've got to love a low-fat diet. Fat has more than twice the calories per gram of protein or carbohydrate. It's very tasty, very energy dense, in terms of foods. If you pour on olive oil onto a salad, you're eating something which is...or for that matter full-fat dairy products like cheese, dark chocolate...you're eating some of the highest calorie dense imaginable foods, and yet time and again, low-fat diets have done less well, not better, than higher fat diets.

Dr. Hyman: So you're saying it's not a math problem.

Dr. Ludwig: Yeah.

Dr. Hyman: It's not a math...it's not like, "Oh, it's got more calories than carbs so we should just eat less fat. We'll lose weight."

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Dr. Ludwig: Yeah well, the calorie based model works really well if you're a toaster oven. You can measure the calories going in, or the heat going in, the heat coming out and you'll come up with just the right answer. Humans aren't...

Dr. Hyman: We're not toaster ovens?

Dr. Ludwig: We're not toaster ovens. The issue is both the problem with the standard mindset...but the great opportunity to devise much more effective long-term approaches is that the observation, which has also been known for decades, if not a century, which is that body weight is under biological control. When you start cutting back calories, it's not just that the system empties, drains out, excess calories, the body responds and adapts. And we know what those adaptations are.

Dr. Hyman: It sort of backfires on you, right?

Dr. Ludwig: People tend to overeat and become heavy because they're hungry. That's the main reason. There are other reasons, psychological factors or environment, but people overeat typically because they are hungry. And if you cut back on calories, what happens?

Dr. Hyman: You get hungry.

Dr. Ludwig: You get hungrier. And the other thing that happens...

Dr. Hyman: You're always hungry.

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Dr. Ludwig: ...is your metabolic rate drops. You've got this untenable situation. Your willpower may say, "I've got a weight problem, I've got to cut back calories, and I'm going to stick to a diet." And you may have the best of intentions, but your body says, "Not so fast." And it's going to start fighting. And the more you cut back on calories, the hungrier you are, the slower your metabolism becomes, and the more you have to keep cutting back in order to maintain that degree of weight loss. That's a battle between mind and metabolism that we're destined to lose.

Dr. Hyman: Yeah. That's so powerful, that whole idea that we've all been sort of fed, is that if you eat less calories, we're going to lose weight, and that we should restrict our calories to lose weight, and that all calories are the same so that it doesn't matter where they come from, as long as you eat less of them, it's okay. But what you're saying is that it actually slows your metabolism, and it actually makes you hungry, and you always fail. That just doesn't sound like good news. What I want you to share is how you've done these elegant studies to prove that you can shift your metabolism to actually being faster, being less hungry, and losing more weight, even eating the same calorie count. That's the kind of mind-blowing stuff that you've done that I want you to share, because nobody else has really looked at it like that.

Dr. Ludwig: If we're trying to examine this question, "are all calories alike," that's a question...it's a very provocative question. In physics, of course all calories are alike. I used the toaster oven metaphor. But if you want to question that model and ask, from a practical standpoint, "Is it appropriate to say that all calories are not alike? How do you test that?" Well you could give people different foods and see how much they eat, but we know that tasty foods are going to make people overeat over the short term. That's not really a test of this, "calorie alike, calorie different," model.

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What we decided to do was jump across the equal sign in the calorie balance equation, and asks the question, "Do the nature of the calories going in affect the number of the calories coming out." The way we did that was to take, in a study we published in JAMA in 2012...

Dr. Hyman: I mean, what you're saying is, if you eat different kinds of calories, do they...some will burn faster, or slower, can you check that out?

Dr. Ludwig: Can the kinds of calories you eat alter your metabolism in ways that standard science and medicine will see as relevant to the success of long-term weight loss? In the study, 2012, we published, it was a feeding study done in a crossover fashion. We took 21 young adults with high BMI, high body mass index, who had been weight stable, brought their weight down by 10-15%, stabilized them at that new lower level, and then fed them for a month at a time one of three diets. And that was done at a randomized fashion, so there's no bias involved in that. Everybody consumed each of these three diets, and they represented basically the full spectrum of macro-nutrients.

On one end, we have the conventional low-fat diet, 20% fat, 60% carbohydrate. The other end was the classic Atkins diet, with a whopping 60% fat. You know, it would give a nightmare to...

Dr. Hyman: A cardiologist.

Dr. Ludwig: ...a conventional nutritionist. In the middle was a Mediterranean, we call it a low glycemic index diet. We can talk more about that term. I'm sure many of your listeners will know that term, glycemic index. So we had 20% fat, 40% fat, and 60% fat. Pretty much the whole spectrum.

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Dr. Hyman: The whole gamut.

Dr. Ludwig: You can do even more than that, but if you think if something was going on we should be able to see it. And so we studied that after this weight loss, when their metabolism is already stressed, on one of these three diets. We found that as expected, total energy expenditure, we measured this...

Dr. Hyman: They were all the same calories right? You just changed the ratios of protein, fat, and carbs, but the calories were the same.

Dr. Ludwig: Exactly. That's right. Brought their weight down, stabilized them, and gave them the same calories. The same calories going in on each of these...

Dr. Hyman: And you fed them the food. It wasn't like, "Oh, just try to eat like this," you actually gave them the food, which is a way better kind of study.

Dr. Ludwig: Yeah. We fed them everything they ate for this, what was a 7 month protocol, basically everything they ate. During the key points where we collected the data, we admitted them to the hospital, so we could not only feed them, but we could keep them under 24 hour-a-day observation to prevent people from sneaking off and having a bacon double cheeseburger if they're on any diet, frankly. What we found was we measured the total energy expenditure by something called stable isotopes, doubly labeled water. It's a very precise way to get energy expenditure over several days with people living their normal diets. It's important...

Dr. Hyman: It's a way of double checking on people.

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Dr. Ludwig: Yeah. If you lock people up in a room to measure the metabolism, you're affecting your physical activity, and other factors. What we found was that total energy expenditure, the total number of calories being burned off, plummeted on the low-fat diet as was expected. And this has been seen on many other studies. It dropped by more than 400 calories a day. It's a big drop, so you're going to be feeling cold, tired, and hungry. That's going to be a bad predictor for weight gain. A low-carb diet saw no significant decline in their energy expenditure at all, so it was not different from pre-weight loss. The low-carb diet had completely abolished...

Dr. Hyman: Low-carb, high fat.

Dr. Ludwig: The low-carb, high fat diet, exactly, the Atkins-like diet, had completely abolished this negative adaptation to weight loss. And the low glycemic index, Mediterranean diet, showed an intermediate value. That difference between the extreme diets was about 325 calories a day.

Dr. Hyman: Unbelievable.

Dr. Ludwig: That's equal to the energy in an hour of moderately vigorous activity in effect without lifting a finger.

Dr. Hyman: So it's like exercising without getting off the couch.

Dr. Ludwig: The study, at least in proof of principle, argues that in a meaningful way all calories are not alike to the body. The kind of calories going in alters the number going out, and if that's the case and the low-fat diet looked the worst, we really have to be thinking our basic paradigm.

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Dr. Hyman: Yeah, that's incredible David. Incredible thing. I just want to sort of point out that there's a lot of people doing nutrition research, but there are very few what I would call "super scientist" who are meticulous, and thorough, and think through the design, and actually cut out a lot of the objections that people have. Because most nutrition research is very poorly done, and it's often also population research where you actually can't even draw conclusion. David's research is unique in that way, and that's why it's so interesting. One of the set of points that I want to dig into with this study is when these people had a slower metabolism by 300 calories a day, did it affect their weight change at all? Did the group eating the low-fat diet lose less weight than the group eating the higher fat diet?

Dr. Ludwig: We did it for just a month at a time, and we locked their calorie intake, and it really wasn't enough time to see their weight change based on their energy expenditure alone. I mean, as expected, the weight started to drift. There was a little bit of a change in the expected direction in their body weight. But remember we just locked them in.

Dr. Hyman: But you wouldn't expect that the low carb, high fat diet, they would actually lose more weight over time, even on the same calories.

Dr. Ludwig: Yeah. It implies if this adaptation and this is a short-term study so we don't know if it applies to the long-term, but if that 325 calorie difference were permanent, that would be basically the whole obesity epidemic. If you translate those 325 calories a day into permanent weight change, you're looking at about 30 pounds when you reach your new stable weight.

Dr. Hyman: Unbelievable. That's big.

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Dr. Ludwig: That's pretty much what the population has gained over the last 40 years.

Dr. Hyman: Yeah. Unbelievable. You know, one of the sort of things that I want to ask you about is getting into the biology of obesity, because you're one of the few people I think understands that, and I've read everything you've written so I have some idea of what you think, but it's just so profound to rethink the nature of why we get fat. That's an important question that nobody's really asking is, "Why do we get fat, and how do we stop that inexorable slide into obesity that we all seem to be going into?" I want to sort of dig into the biology of obesity, and when you talk about how fat affects us, what is actually happening to our hormones and our metabolism? You saw this phenomenon, but can you explain it so that we can understand what's actually happening in the body?

Dr. Ludwig: Yeah, sure. Well the premise of our book, it's...

Dr. Hyman: "Always Hungry"

Dr. Ludwig: "Always Hungry"

Dr. Hyman: Which is not what you're going to be when you read the book, you're always going to...it should be called "Always Not Hungry."

Dr. Ludwig: Yeah, well it's a question mark, and the program in the book is called the always hungry solution.

Dr. Hyman: It's not that you're always going to be hungry, it’s like, "Are you always hungry? Because if you are you need this book."

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Dr. Ludwig: Read this book and I'd be happy to talk to you more about it if you'd like. The premise of the book...

Dr. Hyman: Yeah, unpack the book and what you've kind of, yeah...

Dr. Ludwig: ...is a little provocative, which is that overeating doesn't make you fat. Not over the long-term.

Dr. Hyman: You're a professor at Harvard and you're saying this nonsense? Of course overeating makes us fat, isn't that what makes us fat? Tell us why that's not true.

Dr. Ludwig: I am now a professor at Harvard that is true.

Dr. Hyman: Why is that not true?

Dr. Ludwig: The process of getting fat makes us overeat. Something has triggered our fat cells to suck up and store too many calories, to hoard those calories, so there aren't enough for the rest of the body. From that perspective it's understandable what's happening with our hunger and metabolism. The brain doesn't realize that there are too many calories in fat cells. It just seems there's too few in the blood stream for the needs of the brain itself, and the rest of the body, so it makes you hungry to solve that problem, and it begins to decrease metabolism to solve that problem. If the problem is not enough calories in the blood, and you just cut back on calories, you make things worse.

You'll lose weight for a short period of time, but your body is going to fight you back. So the question is what is triggering our fat cells to hoard too many calories? And the obvious culprit...

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Dr. Hyman: Literally they're like little piggy fat cells. They just want to eat all the time.

Dr. Ludwig: Yeah, they're like unruly children who are hoarding all of the marbles for themselves and not sharing with the rest of the body.

Dr. Hyman: And they're belly fat cells, right? It's not just any fat. It's not your butt fat; it's your belly fat.

Dr. Ludwig: Well it could be anywhere, but it's typically predominance in the central adiposity in the belly. It's like thinking of fever as a problem of heat balance. You know too much heat in and not enough heat out. That would define fever. But we wouldn't tell somebody with a fever to take an ice bath. Why? It would work, it would lower your temperature, but what's going to happen? You're going to start severely shivering, your blood vessels will constrict in your body's attempt to fight that intervention, and you're going to feel miserable.

Imagine taking an ice bath without a fever, let alone with, and so ice baths are not popular treatments for fever. Even though it adheres to the heat in, heat out model. Aspirin works more effectively because it lowers the body temperature set point. And that's what we need to do in a more effective treatment for obesity. We need to lower the body weight set point, and once you do that, weight declines naturally. You're naturally less hungry, your metabolism is running better, and you're working with rather than against your biology. The big problem here is the refined carbohydrates that have crept into our diet during the low-fat years.

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Not just bread, pasta, cookies, crackers, the low-fat Twinkies even, sugary beverages people are beginning to understand. These raise insulin levels the most, and insulin is the ultimate fat cell fertilizer. This is just endocrinology 101. Someone with diabetes who gets too much insulin will gain weight and someone with a nuance of type one diabetes, used to be juvenile diabetes, and they're always losing weight if it goes unrecognized for a while. They'll invariably lose weight even if they're eating 10,000 calories a day.

Dr. Hyman: Yeah, that's amazing.

Dr. Ludwig: Without insulin you can't store calories. And so the solution is to...it's not your fault you're fat. That's a big myth. You're fighting your biology, and the answer is to get biology to work on your side, not by cutting back calories which doesn't change the dynamic, it makes it worse. It's like changing what you eat so insulin levels drop, and then there are other influences on the fat cells that we should talk about. Get the fat cells to come down; open up, release their calories back into the body, you suddenly feel an intense sense of well-being. Hunger drops, cravings vanish, and we've looked at this in brain studies with magnetic resonance imaging, MRI. The cravings turn off.

Dr. Hyman: So you can see it in your brain.

Dr. Ludwig: Within one single meal, the area of the brain called the nucleus acumens, which is ground zero for addiction, in one meal of a fast acting carbohydrate versus slow acting carbohydrate...even just the same amount of carbohydrate, the same calories, one lights up the nucleus acumens and the other doesn't. It quiets it down.

Dr. Hyman: I call that your "trick milkshake study."

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Dr. Ludwig: Yeah. If you're hungry it's one thing, but if your nucleus acumens get into the act, it's game over. Then your ability to...because the nucleus acumens relates to the word craving and saliency. You can maybe ignore hunger, but if your motivation is just emptying out of a cup with holes in the bottom...

Dr. Hyman: Yeah, it's not going to...so let me, let me stop for a minute because I want to break this down. It's so much juicy information I want to make sure that everybody gets this. In this study, what happened was you took two identical looking and tasting milkshakes, one with a really fast acting sugar carb, and one with a super slow acting one that didn't really jack up the blood sugar, and you fed it to these overweight guys, and you look at their brain under this MRI, and you look at their blood and you saw what happened, and it was amazing. Because it was exactly the same calories, exactly the same protein, fat, carbs, fiber, everything was the same, so it couldn't be like, "Oh, it stimulated their pleasure center because it tasted better." You kind of took that out of the equation, and then you found that their brain lit up like a Christmas tree with the ones who had the fast acting sugar, like the addiction center just turned on.

And then they were hungrier, and their blood levels with insulin, and sugar were all higher, and everything changed, but it was the same exact calories and the same exact ratios.

Dr. Ludwig: You're right. You try to do this in a double-blind fashion. Same calories, same protein, fat, carbohydrate, controlled for sweetness, and done in a blinded fashion so people didn't know what they got.

Dr. Hyman: That's why I said trick milkshake.

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Dr. Ludwig: I think they liked it. It was a real milkshake.

Dr. Hyman: But it was a trick. One was a trick. One was a low sugar milkshake.

Dr. Ludwig: Well one was a standard milkshake, which is loaded with fast acting carbohydrate. I guess the trick one was the slow-acting.

Dr. Hyman: That's right.

Dr. Ludwig: That's right. All right.

Dr. Hyman: It was sneaky.

Dr. Ludwig: Point, Hyman. And we did it in a double-blind fashion so people couldn't try to psyche it out, or sometimes, placebo effect. If you think you're getting something, it can affect brain function.

Dr. Hyman: They didn't know which one they were getting.

Dr. Ludwig: We saw, as expected, the blood sugar rose initially very fast, after the fast acting carbohydrate. Insulin rose more, but then it bottomed out a few hours later. At four hours, which is the time we were most interested in, at that time people recorded feeling hungrier after the fast acting milkshake. And then when we looked at the brain. Every single subject...and I've never seen this before in a nutrition study, usually there's some variability, you're lucky if 10 people go one way and 2 the other, and maybe you get statistical significance.

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Every subject responded the same way. Their nuclear acumens were more active after the fast acting milkshake and we got very strong statistical significance and could make a fair statement about that.

Dr. Hyman: And that's why it was in JAMA, and that's why it's so powerful.

Dr. Ludwig: That was in American Journal of Clinical Nutrition.

Dr. Hyman: Was it? Oh, well, okay. It was a good article.

It was a good article, and the other thing about it was it kind of underscored the powerful addictive nature of sugar, right? It hit the same areas as cocaine, or heroine, so that's pretty serious. Now...

Dr. Ludwig: I want to just emphasize I don't think this is unique to sugar. It relates to all fast acting carbohydrates.

Dr. Hyman: So that could be bread.

Dr. Ludwig: In fact, there was no fructose at all which people have been frequently focusing on fructose as the bad actor, and just to cut to the chase there in my view, you pick your poison. Fast acting fructose can wipe out the liver in high amounts. But fast acting fructose has a very gentle effect on insulin. Fast acting glucose is okay on the liver at first, but it raises insulin levels the most, and that has an effect on the liver indirectly, as well as the rest of the body. So I don't think it's really, this is the classic "sugar bad." I think we need to move away from the "sugar bad, starch good" model, because white bread raises blood sugar more than table sugar.

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Dr. Hyman: Well you are one of the first guys that said the glycemic index matters, and it's like, guess what? Bread has a higher glycemic index than table sugar, so we should be not so dumb and think about complex and simple carbs, because that's not actually how it works.

Dr. Ludwig: Yeah. So I'm not saying that fructose is as good as glucose, I'm saying that glucose is as bad as fructose.

Dr. Hyman: Right, right. They're both bad. I want to go back to what you were saying before about the biology affects us, because the fat story also connects to the brain and I just want to sort of loop back to that for a minute, and then come back to the biology of that. The implication is that if you eat more fat, and I talked to other researchers about this like Kevin Hall, that it actually shuts off the hunger and craving in the brain. Sugar lights it up, but how does fat turn it off?

Dr. Ludwig: In any nutrition study, we don't know if it is the thing that you're eating, or the thing that you're not eating, because of the thing that you're eating. Is it the fact that the fat is inherently good, which it probably is, or is it the fact that when you're eating more fat, you're displacing mostly refined carbohydrate? When we were told to focus on decreasing fat and saturated fat, what happened was, we did. But we wound up not eating more fruits, vegetables, and legumes; we wound up eating more refined carbohydrates. Starch and sugar. Between white bread and butter, the bread is the less helpful component.

Dr. Hyman: If you're going to pick the bagel or the butter, you pick the butter, not the bagel.

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Dr. Ludwig: You really don't know, and I'm not arguing that saturated fat is a health food, but it clearly was overly demonized for the last 40 years, and had huge inadvertent consequences in altering people's eating habits and driving the intake of processed carbohydrates. Is it the fat that's doing something good, or the absence of the carbohydrates? And I think the last part is the key point, because when you eliminate the carbohydrate, especially the refined carbohydrate, your insulin levels plummet.

Dr. Hyman: Go down.

Dr. Ludwig: But you're going to be hungry, so where do you get those calories from? You can get them from slow acting carbohydrates, you can get them from fats, and you can get them from protein. And, in practice, the slow acting carbohydrates are hard to consume in enough quantity. The lower the fat you go, the more likely you're going to be replacing those calories with high glycemic carbohydrates. In practice, I think raising fat is the easiest way to do it. As to whether everybody should be on a high fat diet, or some people really can get by with moderate levels of fat, or even relatively low-ish fat, is an interesting question about individual variability and susceptibility.

Dr. Hyman: There's total difference in our population genetically. I've seen it as a physician that not everybody responds the same way, so that's clear. But I want to go back to this fat thing, because what I understand from your research on the biology of fat cells, and your hypothesis that overeating doesn't make you fat but being fat makes you overeat, is that, and it's sort of simplistic how I'm going to explain it, but when you eat sugar or refined carbs, insulin levels go up. Insulin drives that available fuel from the meal you just ate into your fat cells, because they're hungry fat cells, right?

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Dr. Hyman: Is that right that the fat cells suck up the available fuel?

Dr. Ludwig: Yeah…

Dr. Hyman: And then all of a sudden, you feel hungrier because all of the calories, and fuel, and fatty acids, and ketones are out of your blood, and then your metabolism slows down because your body thinks you're starving even though there's so many calories stored in your fat cells, and then you're hungrier, and so the whole thing just gets messed up, so you store fat, you get hungry, you slow your metabolism, it's like a bad combo for losing weight?

Dr. Ludwig: Yes. Metabolic double whammy. Think about it this way. There's been dozen of force-feeding studies, just as there have been starvation studies done, in controlled settings over the last 50 years or so. When people, regardless of their starting weight, are force-fed so that they gain 30 pounds, they're miserable. They're just as unhappy as the participants in the starvation studies. As soon as that force-feeding protocol ends, what happens? Their weight comes back down to where it started, or even overshoots. They wound up lighter than the people in the starvation studies.

And that, I think, illustrates why overeating doesn't really make us fat. Yes, you can gain a few pounds or lose a few pounds by changing your calorie balance, and that gives the illusion of conscious control, but that only lasts until biology kicks in. And the biology is kicking in because those high insulin levels are fertilizing the fat cells, causing them to hoard too many calories, and you can't fight that over the long term. We've got primal parts of the brain, the hypothalamus and other areas, that are designed to prevent us from becoming hypoglycemic and having too few calories.

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Dr. Hyman: Low blood sugar, yeah.

Dr. Ludwig: When it, and it's not just glucose, it's also fatty acids which are key fuel, when the brain perceives that, it activates primal mechanisms that go back hundreds of millions of years in evolution. We're no match for that. We don't have control over the total number of calories that we eat over the long term. We do have control over quality. When you change quality, calories follow. You focus on quality, the calories will follow.

Dr. Hyman: You mean you'll eat fewer calories?

Dr. Ludwig: Well ultimately you'll either eat less, or your metabolism will not fall. With weight loss it will be relatively faster in the combination of the two. But when your fat cells open up and release calories, you feel intense satiety.

Dr. Hyman: Which means you're not hungry.

Dr. Ludwig: We've all felt satiety. It's the same feeling like if you ate too large of a Thanksgiving meal. You're going to be actively disinterested in food. Your brain areas involved in hunger and cravings are going to shut down, and you're going to actually want to avoid food. And that's how people following weight loss surgery feel, and that's why they lose weight for so long. We can bypass the bypass, by bypassing our highly processed diet.

Dr. Hyman: You're saying gastric bypass without the pain of surgery, vomiting, and malnutrition basically is what you're saying.

Dr. Ludwig: There's that.

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Dr. Hyman: That's great. I think it's amazing. I'm a practicing doctor and I just read people's research, and I take in the work that you've done, and I've applied to my patients, and over and over again it works. People lose weight. They're not hungry. They feel better. It's astounding and I'm so glad you've wrote this book "Always Hungry" because you've now taken all this life work that you've created and it's told the story. And you've unpacked it over decades, really. You've unpacked it meticulously, methodically, and unpacked this story so that we can understand it, and it's in this book, "Always Hungry," which I'm just so excited about. I gave you a quote, and I'm going to help you promote this because everybody needs to read this book.

Dr. Ludwig: Yes, your quote is on the cover. On the front cover.

Dr. Hyman: Oh, thank you. And you even...you know I came to your house, and you made me a meal from the book, which was so great. It was lamb, with all kinds of fat, and my favorite kind of fat is actually lamb fat. That's actually my secret pleasure is lamb fat.

Dr. Ludwig: But just to add...my wife, we thought it was real important to have vegetarian versions for all of our recipes and meal plans, and so there are options for meat eaters and vegetarians.

Dr. Hyman: Absolutely. But your book is full of these recipes that are creamy, satisfying, delicious meals, and I want you to tell everybody about the study you did. It was sort of like a trial, and what happened, and what people experienced. You know, you obviously...

Dr. Ludwig: In our pilot?

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Dr. Hyman: Yeah, in the pilot study.

Dr. Ludwig: Okay, so just to be clear the pilot wasn't research. We didn't have a control group. We wanted to see how the program that we had developed for the book...it's a three phase program with three weeks of meal plans and about 75 recipes, and then other supports because we didn't talk much about this. But in addition to lowering refined carbohydrate, replacing that with fat, you want to look at other influences on the fat cell. And the three key ones are stress reduction, quality sleep, and enjoyable physical activities. Not to burn off calories so much, but to improve insulin sensitivity and to keep your body from getting too sedentary. The program walks the reader by hand through all of these systematically.

The first phase is 50% fat, 25% carbohydrate, 25% protein. It's a very high fat, lush diet, full of rich sauces and spreads, nuts and nut butters, full fat dairy, avocado, dark chocolate, olive oil, you know it is just so lush.

Dr. Hyman: Yum. Stop, I haven't had dinner yet. I'm hungry.

Dr. Ludwig: That lowers insulin levels within a day or two. We did this pilot with about 235 volunteers from around the country, and we just did the program with them to fine-tune it, to find out which recipes needed a little last minute tweaking, and what worked. And we did that last year, and their stories appear, of these participants, appear throughout the book, and I want to say that every story's authentic. You read a lot of diet books...

Dr. Hyman: They make stuff up.

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Dr. Ludwig: Well, they call them composites. Composites means the author kind of sits back and thinks about what an ideal patient he might have had once did, and then that's the story. Every story in here is absolutely real. You can't make this stuff up. We saw people before the first pound was lost, most characteristically the cravings would turn off just like that, brain imaging study. We heard people who had been afraid of...and we got people throughout America, including Wal-Mart shoppers in Middle America who maybe aren't as up on some of the higher fat alternatives in the last few years. They've been following low fat diets and were frightened.

They thought that, "If I eat these foods, I'm going to gain 20 pounds, not lose 20 pounds." They consistently reported, within a day or two...

Dr. Hyman: It's fear of fat, it's like epidemic right?

Dr. Ludwig: The cravings turned off, hunger decreased, and then within a week or two, the foods that they depended upon, the cookies, chips, crackers, sugary drinks, they not only weren't attracted to them, but they found them unappealing. They would take a bite of a cookie and they would say, "Alright, what was the big deal?" That is not willpower, that's something primal in the brain changing, and so our approach is really focused on molecular medicine. It's trying to change the body in a way so that it serves your needs and doesn't undermine you.

Dr. Hyman: And you don't have to fight it with willpower. That's so amazing. That's so great. That program works, and what's so amazing about it is exactly what you said. People, I know, panic when you say to them, "I want you to cut out sugar and refined carbs." They panic and they start negotiating, "Well can I have this, and can I have that, can I have this," and you know they're addicted,

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right? I've never been able to stop, and I've never been able to conquer my cravings, I'm completely powerless. And like you say, within days of actually jacking up the fat, cutting out the sugar and refined carbs, all of it changes. And people actually get freedom from this food prison that they've been in that they have no control over.

Dr. Ludwig: Yeah. Many studies of women, mainly middle-aged women who had given up, who'd been depressed and struggling that for years, giving up their medications during those 16 weeks. Why should it be so surprising that the quality of our foods would affect, not just our bodies, but our emotions and our well-being? But the last thing that I want to say is that there's some people...you'd asked earlier about individual differences and do we need this, everybody or what, there's some people...and we live in a country where two-thirds of the population, probably, likely based on just body weight, have significant metabolic problems, if not severe insulin resistance and dysfunction of their beta cells that make insulin. Most people are going to need substantial reductions in carbohydrate and processed carbohydrate, but that may change.

And we just published a study that suggested that after just one month on a lower carbohydrate diet, you kind of reset your beta cells that let you then eat more carbohydrate and then get away with it.

Dr. Hyman: Be more resilient.

Dr. Ludwig: The first two weeks is this 50% fat, then the phase two is 40% fat, and you stand that until your body weight resets and you get to this lower weight, and then the third phase is you find your individual tipping point. If you can tolerate a little more carbohydrate, go ahead. Have a baguette when you're travelling in Paris.

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Dr. Hyman: But only in Paris. You can't have it in New Jersey, because the New Jersey bread is different than the Paris bread.

Dr. Ludwig: Maybe have a little bit of an everything bagel if you can tolerate it. But if you're the sort of person that really can't, phase three of the program is designed so that you discover that yourself. Nobody is telling you what you can and can't have. You experience it. We encourage people. Try to have some.

If you get negative reactions, you've seen how good you felt. Your body will be your own teacher. Once you've experienced it, you just don't want to go back beyond your limits. And if you do have a stressful time, you fall off the wagon, you can always just go back to phase one.

Dr. Hyman: Yeah. It's true. I always hear the best doctor in the house is you. Your own body. If you listen, and pay attention...and the thing is David, most people don't connect what they eat with how they feel. There's a total disconnection. And what you're seeing, is when people do this program, and it's just basically the same thing I recommend, is actually they start to notice not just weight loss, but all sorts of other health conditions get better or go away, right? So what kind of things happens when people start eating more fat, and cut out the sugar and the high carbs?

Dr. Ludwig: Well the first thing is the cravings turn off. Well-being improves before the first pound is lost. And usually your waist circumference decreases. Here's a little thought experiment. If you're going to lose four inches off your waist, is it better to lose that and lose 10 pounds, or lose 20 pounds? You probably know the answer, because you're Mark Hyman. It's actually better to lose 10

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pounds, not 20, because the 4 inches off your waist tells you how much fat you've lost. The total weight that you've lost is going to include lean tissue.

Even people who have quite high BMI still have more lean tissue than fat tissue. If you could lose 10 pounds of fat and 0 pounds of lean tissue, you're going to be much better off. You're going to look better, and you'll have much less risk of weight regain than if you lose 10 pounds of fat tissue, and 10 pounds of lean tissue.

Dr. Hyman: Yeah. You want to do more fat loss, and that's great. That's what this does. That was what was fascinating when the study you did years ago, you published a study on animals, on actually giving them high fat or a very low fat diet...

Dr. Ludwig: The two diets were, if you're talking about the Lancet study.

Dr. Hyman: Yeah, the Lancet study. Yeah.

Dr. Ludwig: Published the Lancet in 2004. We took rats, identical strain, randomized them, to get the same diets. Again, the same protein, fat, carbohydrate, just high glycemic index, fast acting, or slow glycemic, slow acting.

Dr. Hyman: But also higher fat?

Dr. Ludwig: No, this study was controlled.

Dr. Hyman: Oh, it was just sugar, okay.

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Dr. Ludwig: Yeah, it was just fast acting versus slow acting, and we found that we started having to put the fast acting carbohydrate rats on a low calorie diet, because they were gaining, at the same calorie intake, they were gaining more weight. We had to do what you're supposed to do. Put them on a diet. We kept their weigh the same, and then we looked at their body composition. At the same weight, the high glycemic index rat had about twice the body fat mass. Its bellies were just filled with fat. The low glycemic index rats had bellies almost totally devoid of fat. At the same weight, we did what we were told to do. If you're gaining weight...

Dr. Hyman: If you're gaining weight, you cut calories, but guess what? You get fatter.

Dr. Ludwig: You're gaining weight, you cut calories. We succeeded in preventing weight gain. The animal's heart disease risk factors and diabetes risk factors were sky high.

Dr. Hyman: So you're what we call a skinny fat person. You look skinny, but you're actually fat on the inside, skinny on the outside, right?

Dr. Ludwig: Yeah. TOFI.

Dr. Hyman: TOFI, right.

Dr. Ludwig: Thin Outside, Fat Inside.

Dr. Hyman: But also, I've seen some studies where if you eat more fat, you actually increase your muscle mass. How does that work?

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Dr. Ludwig: Yeah. In that study we did it by...I think the key is lowering a highly processed carbohydrate. At low fat diets, if you're eating 20% fat, and I'm not saying that...there have been some populations that have eaten low fat diets in a pretty healthy way. Japanese, traditionally. But the lower the fat, the harder it is to avoid the refined carbohydrates, and there are some people, many people, who have insulin resistance and other metabolic problems, that just can't tolerate that no matter what carbohydrates they're eating.

So the easiest thing to do is bump up the fat, we go to 50% for a while. And then you find your tipping point.

Dr. Hyman: That's like heresy, 50% fat, right?

Dr. Ludwig: It is so luscious.

Dr. Hyman: It's delicious, right? It's such good news. We were all suffering for years with low fat this and low fat that, and now it's like, "Hey, you can have fat again."

Dr. Ludwig: And I don't think most people have to stay at 50%, but it kind of resets the metabolic slate, and then you can begin to come down and find your tipping point.

Dr. Hyman: Such great work Dave. Such amazing work. The other thing I wanted to point out before we close is that you've been a huge voice in food policy, and you write these brilliant editorials, I call them like "ninja science." You use the science to show how stupid what we're doing is, and you do it in a way that's very polite, but it's actually like putting a dagger in the heart of the food industry and in our policy makers. And I'd like you to sort of talk about

some of the big ideas that you think could actually make a difference to change our food system and get rid of this obesity epidemic that we're all suffering from that's affecting us economically, that's affecting us socially, that's really crippling families and communities and really even affecting our standing in the world. How do you see us getting out of this?

Dr. Ludwig: Well, I think the first place to start is why do we live in an environment where the healthy choice is the hardest? Why isn't the healthy choice the least expensive, and the most convenient? Now this tends to degenerate into an argument between liberals who want government intervention, and conservatives...maybe I should use the word progressive rather than liberal. Progressives versus conservatives who think the government should just get off our back. But I think that this argument has polarized...

Dr. Hyman: No more nanny states, right?

Dr. Ludwig: What's that?

Dr. Hyman: No nanny states. You know what nannies do right? Nannies protect our children. I think that's a good thing.

Dr. Ludwig: But people argue we're adults and we don't need protection. The problem is the government is already in up to its ears in food policy. We don't have a free market for food. The markets for all sorts of things are highly influenced by government regulations. We want that to be the case. Do you want the government to just say, "Listen, car safety is a matter of personal choice? We're no longer going to enforce any regulations or rules around seat belts, or standards or anything, and you go figure out yourself."

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We would never think of doing that, not just because we'd be horrified, we wouldn't be able to figure it out ourselves, but our decisions would affect others as well. And food is no different. The government is already involved in food policy through subsidies and supports, through policies that date back to the Earl Butz era in the mid-century.

Even labor laws that allow fast food companies to pay their employees so little, and require them to in effect get subsidized by welfare, by SNAP, food stamps and the like. We're in effect subsidizing fast food and junk food makers in all sorts of ways.

Dr. Hyman: And in the back end we have to pay for all the diseases they cause through Medicare and Medicaid, right? So we're paying on the front end, paying on the back end, we're subsidizing agriculture in the state and it's a mess, right?

Dr. Ludwig: The answer is just what we would do, we proposed recently in a piece, and this one was in JAMA, a small tax on all processed foods and take all that money and take all that money and put it to subsidize whole foods. And since we eat so much more processed foods than whole foods, a small tax on that would lead to a massive reduction on the costs of fruits and vegetables, for example. We think that alone would have a massive impact on public health. But for the public, I think what we all can do, is vote with the fork as well as with the ballot.

Every time we choose to eat something, we make a purchase; we're committing a political act. And that act has implications, not just on our body, but on the food supply, on the behavior of corporations. We also have to start thinking of

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voting based on politicians' policies around food. You know, that's really one of the top issues. And why don't we...

Dr. Hyman: Most of them don't have any.

Dr. Ludwig: Why didn't we hear about this at the debates? Why aren't we hearing about this in the political debates? Politicians should be expected to lead, and if they're not willing to lead, we have food day in October, which I believe you were involved in, Mark, at the New York Times. There is growing awareness. There are pockets of...there are little grass fires that are alight around the country, and we need to consolidate around a coordinated vision, and I think get out of this polarizing debate of whether we want the government to intervene or not, into how can the government, which is already involved, intervene in a way that aligns profit and public health, and not create motivation to undermine public health by the food industry.

Dr. Hyman: But the food industry is so tied in, and the lobbying is so big, and they're so intertwined in policy making government that our policies don't match science, right?

Dr. Ludwig: Well another key part of this is actually campaign finance reform. As long as the Center for Responsive Government, I think there name is, or it's an expose website that does exposes, found that the food industry's giving at least $50,000,000 a year to politicians. Whose interest are they going to be representing?

Dr. Hyman: I mean Monsanto gave $30,000,000 just to defeat one proposition in California on GMO labeling. That's just one policy.

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Dr. Ludwig: That's not even considering legislation. That's just talking about donations to politicians. And if you get a few hundred thousand dollars from the food industry for your election, is that going to influence a little bit your votes on these matters?

Dr. Hyman: I mean, you've written about this, but I've talked to Ann Veneman, who was the former Secretary of Agriculture under Bush, and I said, "Ann," who's very forward thinking and she's part of the bipartisan policy commission and really looking at this obesity question and food policy, and I said, "Ann, how come the USDA, who does the food stamp program, how come they spend $4 billion for soda for poor people, and like on the back end have to pay Medicare and Medicaid?" I said, "Why does that..."

Dr. Ludwig: We've written about that, too.

Dr. Hyman: I know you have, and I said to her, "How come the USDA dietary guidelines don't match science policy, and they recommend three glasses of milk a day," which you've also written about is nonsense.

Dr. Ludwig: Nonfat. It’s okay to drink nonfat, sugary chocolate milk, but you can't buy simple whole milk in schools. It's not available.

Dr. Hyman: And it's so contradictory to the science that we have. And I said, "How come we can't make science into policy?" She goes, "Mark," she says, "The food industry has a lock on congress, and the White House." And I'm like, "How do we do that? How do we figure that out?" And I think that's the challenge. I think we need to figure out how to attack this, and it's hard. I met with the vice chairman of Pepsi the other and I had dinner with him, and he was like, "Mark," I said, "Why are you using high fructose corn syrup in your soda? Why

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don't you use sugar? It's just better for you." Like I think it's better, and we can debate that too, but I think there's value there.

Because some of it's not just 50/50, it's like 75% fructose and has effect on the liver and so on. I said, "Why don't you do that?" He said, "Mark," he says, "We're in business. The government is actually paying for us to use this by subsidizing it and making it cheaper. So yeah, I'm going to use it, because it's cheaper. But like, I'm sorry. This is how it works." I think that's kind of a scary statement coming from somebody like that. I think we have to kind of really, as a society, begin to take these issues on, and take a stand, doctors, hospitals, healthcare systems, and really stand up to this.

Dr. Ludwig: This is a $1 trillion dollar a year industry. There isn't anything more political than food.

Dr. Hyman: No, it's true. I don't know if you're going to the "Food for Tomorrow" conference, did you hear about that? New York Times conference. Because I'm excited.

Dr. Ludwig: No.

Dr. Hyman: I'll tell you about, I'm going. It's exciting. I think, you know, David, you're one of the people I look up to in this field. You are taking a stand for the right things, you're doing the right science, you're doing now incredible studies, big studies that are going to change the way we think about calories forever. And if anybody is really interested in this issue of sugar, fat, policy, follow David at his website, check out his book, and you will always be enlightened and delighted. Thank you, David, for joining me tonight and enlightening us about the biology of fat. Any last words of wisdom?

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Dr. Ludwig: It's been great talking to you. And let's just remember that with just the community of people listening to this Skype session, if we got 100,000 people to demand change throughout the country that is going to have a massive effect. That is going to be felt. You know, vote with your fork, and vote with the ballot.

Dr. Hyman: That would be amazing.

Dr. Ludwig: I think together we can begin to turn the tide.

Dr. Hyman: Here's a promise then. When this summit comes out, because we're pre-taping it, I'm going to figure out how to create a petition. You and I will figure out what we're going to ask people to sign and ask the government to do, and then we'll send it around as part of this summit so people can actually take action. They don't just sit there and listen to us but actually they can be part of the change which is really exciting. You up for that?

Dr. Ludwig: Sounds good.

Dr. Hyman: Okay. Alright, David. Thank you so much. Have a great day.

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