THE MODEL HEALTH SHOW

EPISODE 566

The Science Of Body Fat & How Fat Loss Actually Works

You are now listening to The Model Health Show with Shawn Stevenson. For more, visit themodelhealthshow.com.

SHAWN STEVENSON: Welcome to the Model Health Show, this is fitness and nutrition expert Shawn Stevenson and I'm so grateful for you tuning in with me today. Spring is officially in the air, people are looking to get in shape, mask are coming off. People are wanting to connect, to relate, to get out in the world. And of course, fitness is now getting on people's minds again. So instead of trying to trim the branches of the issues, I thought that we would get to the root today of what is really creating a healthy body composition and talk about all of the science around how our body fat actually works, how the process of fat loss works, and also provide some key insights from some of the leading researchers on how to optimize this process. So, this is a wonderful focus compilation dedicated to the science of body fat and how the process of fat loss actually works. Now, to kick things off, we're going to start with a segment from a Masterclass that I did, but specifically zooming in on the distinctions about our fat cells themselves.

Now again, this is going to be loaded with key insights, so we can really understand how our amazing bodies work because oftentimes we're trying to fight something that we don't really understand. And once we get this knowledge into our hands about how our amazing body fat, yes, I said amazing body fat, actually works to have a better association with it, then we're going to be able to drive our body composition into the direction that we want to be. So again, we're going to kick things off with some key distinctions about our fat cells themselves, then we're going to pivot into a conversation with Biochemist Doctor Sylvia Tara, and talk about our body fat and how it controls our hunger and satiety, and also looking at how our body is actually utilizing fat for fuel, and it's not going to be in the conventional way that we think that has not led to very good results for our society. Again, getting this information in our hands leads to a level of empowerment that we really need right now. So, let's kick things off with a segment dedicated to our fat cells themselves.

I'm pumped about this episode. This is the education that I wish I would have received in my university nutrition and biology classes. In learning truly how our metabolism actually works, how does the process of fat loss actually work? How does it happen? Where does fat go when you lose it? Does it go to another dimension? Is it going to the multi-verse? Do we need Ant Man to help us to figure all this stuff out? We're going to dive into that today, and so much more. So, we're going to take you through the process of metabolism, the process of fat loss. Just a very rudimentary understanding of it, but it's going to put so much power into your hands to truly know how the process works, and also, we're going to dive into specific nutrients and foods that actually assist in the enzymes and the hormones involved in the fat loss process. The very first thing to understand right out of the gate is what are we actually dealing with here when we're talking about "burning fat"? What are we dealing with here? So often in our

society today, we're trying to target and to get rid of something that we don't even understand what it is. We don't even know what it is that we're trying to "get rid of". And so, the first thing that I want to share with you, and this is a very important understanding, is that body fat itself, your fat is an organ.

Alright, body fat is an organ. We tend to think about it like it's just scattered droplets of stuff throughout our body, scatter droplets of unhappiness, sometimes scattered throughout our bodies, but it really... Your fat cells in your fat cell communities, which are what we're going to talk about, they work together as an organ, much like your skin is an organ that really spreads and moves throughout your body and is a big part of your nervous system. Your body fat is a huge part of your endocrine system. It works together, much like an organ. And your body fat releases hormones and other substances to regulate your body's metabolism by communicating with other organs and tissues, such as your liver, your pancreas, your muscles, and this introduces a critical but overlooked point in how this process actually works, in that your body fat itself is largely responsible for regulating your metabolism. Your body fat itself is largely responsible for whether it's "burning itself". Alright, so your body fat can function kind of like a stuck man, I guess, lights in itself on fire. But again, it's much more dynamic than that, but it's just the point that I want to bring forth is that your body fat itself is a major player in your endocrine system in regulating hormones, in the communication with all your fat loss and fat storage-related hormones and neurotransmitters and neuro peptides. It's this beautiful, dynamic web.

This beautiful, dynamic picture, and we're going to continue to unpack what that is. Now, there are different types of fat cell communities. Just like any kind of civilization, there's different communities. You've got your suburban, you got your urban, you got your country community. There's all kinds of communities, just like with our body fat, there are certain body fat cell communities. But first, let's unpack a little bit about the individual in the fat cell community, which is the fat cell itself. The fat cell itself, it's called a fat cell because of its uncanny ability to store fat. You guessed it, fat. And fat cells can actually expand their volume more than 1000 times their size, right. When we're born, we have a certain amount of fat cells kind of in our cards, in our genetic destiny, and as we go through childhood and adolescence, and once we get to the age of about 20, the number of body fat cells that you have are just about the same number that you're going to have throughout your lifetime. Alright, I know this sounds crazy because we think that we're growing and building more fat, creating more fat cells, but what's really happening is the fat cells themselves are just getting more filled with contents, and again, it can expand over a thousand times its size, alright.

So, these fat cells are like some hefty, hefty cinch sacks, alright. They're like Santa's sack, alright. Santa can stuff that sack full of gifts. So, it just expands and expands. I'm just thinking about a couple of Christmas movies, shout out to Christmas, alright. So that's what's really

happening when we're talking about gaining weight and "growing fatter" or "growing fat". It's not the fact that we're just starting to haphazardly create more body fat cells, which that is possible, and we'll talk a little bit more about that, but more often we're talking about the fat cells themselves becoming filled with more and more storage, more and more energy, more and more potential energy to be used and packed away for a rainy day. Because that's what the fat cells are designed to do. It's an incredible evolutionary adaptation that humans have developed, that it really enabled us to make it this far and to become the people that we are today. It's thanks in large part to our incredible fat, but we see fat as the enemy. But fat has enabled us to survive when food isn't around. Now, the rub is that today, food is always around for most people here in this civilization. We've got 24-hour access to food, even though I grew up on food stamps and we were getting food from food pantries and charities, and we were on the WIC program and all these different places to get food, we still had a lot of food.

A lot of calorically dense food. Now, please preface, if you don't know this part of the story, make sure to listen to the episode or watch the episode where we did breaking down the history of the calorie and the epigenetic controllers of calories, alright. Because calories are not the tip of the spear when it comes to metabolism and regulation with food. Alright, so make sure you listen to that episode, so I'm just going to take it into consideration, you've already got that piece locked in, and of course, we'll also put it for you in the show notes if you happen to miss that episode. It's very important to understand it because when I went to my private expensive university, I was taught very first day in nutritional science class, that calories were king, calories are the tip of the spear. If you can control your calories and manage calories, you can manage your metabolism. And that story is more one-sided than an elephant sitting on a seesaw with a Chihuahua. Alright, is way out of balance. So, make sure to check that out. But to dive more into this component of it, alright, so we know that the fat cell is storing a lot of energy, a lot of potential energy to be used for a rainy day. Our fat cell's just really, really good at doing its job, it's just so good at storing fat, because that's what its role is, and it's also good at releasing that fat for energy when things are in balance and when it's needed. It just has to get the signals to do that job.

And again, we're going to keep drilling down into what that looks like, but I just wanted to give you a brief summation of what's happening when we think that we're "gaining weight" or "gaining fat", what we're really doing is just filling the fat cells themselves with more content. Now, let's unpack, or should I say pack, what is actually going into the fat cell, what is actually getting stored in the fat cell enabling it to store energy and/or grow, and what's getting packed into our fat cells themselves, and by the way, our fat cells also called lipids, sometimes they're called adipocytes, they're mainly packed with or composed of these tiny packets of stored energy called triglycerides, alright. But they're also known as triacylglycerols. That's another name for it, or TAGs, is a short for that, like, "Tag, gotcha, you fat." Shout out to tag, what happened... Do you remember tag? First, you start with the basic tag, which is like you

tag somebody and run, then you get more evolved, and you get to that freeze tag. Do you remember freeze tag? Somebody tag you and then you're like you frozen and you're like, "Billy, come unfreeze me."

It's just incredible, is just incredible, good times. Do know that tag has actually been banned in some schools? True story, but that's for another day. That's for another day. But triacylglycerols, that's not the name that we're going to use it, because I think it sounds a little bit provocative, triacylglycerols. So, triglycerides, that's what's actually getting packed into the fat cells enabling them to grow, and triglycerides each consists of three fatty acid molecules attached to a single glycerol molecule. So, these fatty acids, three of those, with one glycerol, that's why it's called a triglycerides or triacylglycerol. Now, what's really crucial to understand is that our fat cells literally join together in fat cell communities, so now we know what's actually getting packed into the cell, now we know the role that the fat cell is playing because it's really based on survival, it's just doing the job it's programmed to do, but our fat cells function together in communities, just like any communities here on the planet. You've got different types of communities who do different things. And so, the first community that we're going to talk about are...

When we're talking about "burning fat", we are largely targeting and talking about what are known as storage fats. Okay, storage fats, and the first type of storage fat we're going to talk about is subcutaneous fat. Subcutaneous fat. Now, subcutaneous fat is the fat cells that are stored just beneath your skin. It's the fat cell community just below your skin, and it's able to store caloric energy, padding your muscle, so the fat on the back of your arms, on your thighs on your booty, padding your muscles, if you've ever taken a fall, if you're ever fallen on your rump shaker, you got subcutaneous fat to thank for the little cushion. So, this is a type of subcutaneous fat, and it also helps to regulating your body temperature and also serving as a pathway for your nervous system and blood vessels moving throughout your body from your skin to your muscles and all that communication, subcutaneous fat is incredible. It has an incredible job, an incredible intelligence.

Now, our ability to store subcutaneous fat, again, is an evolutionary advantage that has enabled us to store energy that can be used during times of food scarcity. So that's the first type of storage fat, is subcutaneous fat. Any of these fats can get out of hand. So, number one, subcutaneous fat. The next type of storage fat is called visceral fat. Visceral fat. Also known as omentum fat. Omentum, which is derived from, I believe it's the Latin word meaning fatty apron. Fatty apron. Who knew? Visceral fat has been found... Now, this is the type of fat that unlike your subcutaneous fat, which you can have subcutaneous fat on your belly as well. That's the stuff you can pinch. The visceral fat is a deep abdominal fat. It's the fat that's really pressing upon and putting pressure on your internal organs. So, it's like really cramming up space with your guts, with your pancreas, with your liver. That deep abdominal fat. And the most

important piece here that I want to talk about with visceral fat is that it's been found to contribute most often... Of the different types of fat cell communities that we're talking about, visceral fat has been found to contribute more to diabetes and insulin-resistance than other types of fat, by far. And this is based on data published in the Journal of the American Heart Association, affirmed that carrying extra visceral fat substantially increases your risk of heart disease and having a heart attack as well.

So, it's no joke. Visceral fat, if it gets out of hand, it can be problematic. But again, it's an adaptation that we developed to store energy that we can use in times of need. So, we've got subcutaneous storage fat. We've got visceral storage fat. Now, another one that a lot of folks don't know about... And when I was in school, again, I was taught that fat and muscle are dichotomous. Like you're just trying to burn fat and build muscle. Burn fat, build muscle. That's the marketing. So, you're led to believe that these two things are dichotomous. But they're really intersecting. But they're really attached. But they're really working together. And this is highlighted perfectly in this next type of storage fat, which is called intramuscular fat. Intramuscular fat. This is our third major type of storage fat. Intramuscular fat is used as on-site energy by your muscles for you to do basic movements. So even when I just move my arms just now, thank you, intramuscular fat. It's being used as on-site energy to move our bodies. It can also really act as your muscles' right-hand man. And seemingly though, this fat, even though it's kind of a right-hand man, it can get backup dancer syndrome too. It can want to steal the show a little bit.

And shout out to the background dancers who made it. They hooked up with the lead artist. Shoutout to Chris Judd. What happened to Chris Judd? He married JLO. Kevin Federline. Kevin? Kevin, where are you, man? I hope you're alright. But he locked up Britney. He's a backup dancer, made it to the foreground. So, this muscle can try to steal this show as well. And boy, they stole the show for a minute there. But again, this type of fat is also incredibly valuable and helpful when it's in balance. Now, researchers at the Boston University School of Medicine affirmed that notable increases in intramuscular fat lead to measurable decreases in insulin sensitivity. This is bad news. And when we get into how this process of fat loss is actually working, and the conversation of insulin coming into it, you're going to understand more why this is problematic. So intramuscular fat, same thing. If it were storing too much energy there, and that muscle is becoming abnormally functional, we could start to run in some overall problems with our metabolism. Now to summarize, the three previous fat cell communities that we covered, subcutaneous, visceral, intramuscular, are all fat communities that store energy. They store energy. And they're all in a class called white adipose tissue. White adipose tissue or WAT?

Whereas, when we get to our next community that we're going to talk about, you're going to learn about a type of thermogenic fat cell community that doesn't store fat. It actually burns

it. And that fat that's really become headlined. "news today" is brown fat or brown adipose tissue or BAT. BAT. BAT. In the dark of the night. No, I'm sorry. Okay. Okay, sorry. Somebody hit the bat signal. Alright, now, brown fat is actually the subject of many studies right now, because of its profound impact that it has on our metabolism. It's one of these evolutionary adaptations. Babies have a lot higher ratio of brown adipose tissue. Because it helps to really insulate the body, regulate temperature and protect against hypothermia, keeping us nice and warm and cozy. But as we get older, our ratio of brown fat diminishes. Again, this is a type of fat that burns fat for energy. And on a human adult, most of our brown fat is primarily found around our neck, our collar bones, our shoulder blades, upper back region, down along our spine. That's where we're going to have our pockets and spots of brown adipose issue. But again, it's really a potent energy-burning source. And it accomplishes this partly through a special protein called thermogenin.

Now again, as we get older, our ratio and activity even of brown adipose tissue can dramatically decrease. But there are certain things that we can do with our nutrition and lifestyle to increase our ratio brown adipose tissue.

Now, one of the big takeaways here, and this was published by the Garvan Institute of Medical Research. And this is in my book, Eat Smarter. All of this stuff that we're covering today is in Eat Smarter. So, make sure if you have not read Eat Smarter, USA TODAY national best seller, what are you doing? You need to get this book like ASAP. Also, the audio book is available as well. This study was published by the Garvan Institute of Medical Research, found that once activated, just a tiny amount of brown fat, 50 grams, just 50 grams of brown fat could burn an additional 300 calories of energy in a day, simply upping your body's ratio by just 50 grams is teeny-tiny little amount instantly changes your metabolic rate and increases your body's ability to burn 300 more calories a day. These are these really interesting dynamics of our metabolism that was not taught to me in my conventional university education. And also, how can we actually influence our brown fat ratios? How can we influence the activity of our brown fat, and these are simply things that were not taught to me? And one of the most powerful takeaways about brown adipose tissue is the fact that it's brown, the reason that it's brown is that it's so dense in mitochondria.

It's so dense in mitochondria, which is really an end point for this process of fat oxidation or "fat burning," which we're going to talk about more. But I want to give you the heads up, that brown adipose tissue is so dense in that end destination where fat is actually getting burned. It's one of the things that makes it really remarkable. Alright. So that's another fat cell community. And we're going to share one more here on this angle of potential of what this fat cell community is actually doing. This one's a little bit different. And this fat cell community is a variable fat. It's a variable fat that can actually do different things. And it's called beige fat. Alright. Beige fat. Now, beige fat is the answer to the question, "What if my white fat could get

a tan? What if it could become a little bit more brown and do some different things, do some of the jobs that brown fat does." And beige fat is fascinating in that it actually appears to have the flexibility to act like either brown fat or white fat. So, it's flexible. It has that ability to pivot between two things like Van Damme hitting that split. It's able to do that, to bridge that, to have that flexibility and variability.

According to scientists at Georgia State University, beige fat has potent potential to fight obesity in much the same way as brown fat by burning fuel rather than storing it. But beige fat is genetically distinct from brown fat. Brown fat cells are born from stem cell precursors that also produce muscle cells. Beige fat on the other hand, forms within deposits of white fat cells from beige cell precursors. Alright. Now again, this is coming directly out of Eat Smarter. And there are certain things that we can do with our nutrition and our lifestyle that influence the browning of these beige fat cells and also the activity of our brown fat, which we're going to get to a little bit later in the show. But first, we've got to understand how this process of fat loss actually works.

Next up in our compilation dedicated to the science of body fat and how fat loss actually works, we have a segment from biochemist Dr. Sylvia Tara. Now, she has some pioneering work dedicated to understanding how our body fat really works. And this was one of my favorite conversations that I've had in recent years, here in The Model Health Show. And in this segment, she's going to be sharing some powerful insights about body fat, hunger, and satiety and how it's all connected, and also, how body fat storage and utilization work similarly to a banking system. Alright. So, check out this clip from the remarkable Dr. Sylvia Tara.

DR. SYLVIA TARA: So, it turns out fat is actually an organ. I think most people think of that as a tissue. And in small bits, it's a tissue. So, it's like your skin. If you just take a piece of skin, it's a piece of tissue. But your skin in its entirety functions like an organ. And fat is the same way. So, fat in its entirety in your body actually, it produces hormones that your body depends on. And one of those very important hormones is called leptin. Leptin has a function all over your body. It's correlated to brain size. So, people who are anorexic, their brains actually start shrinking. 'Cause they don't have enough fat. They don't have enough leptin to maintain brain mass. Their bones become more porous. Our bones are dependent on leptin. Our reproductive system is dependent on leptin. So, there are people in the world who have deficient fat, meaning their fat's not functioning well. They have plenty of fat, but they're missing some genes in their fat. And they're not... Their fat is not producing leptin. And those people can't reproduce. They don't have... The women don't have regular periods. The men don't even mature into fully grown men. Because leptin has a strong role in maturity and reproduction. So, our bodies depend on fat for leptin. And so, when we lose fat, we lose leptin.

And once that happens, our bodies really react to that, and then increases our appetite. Our appetites go through the roof. And you might notice if you even lose five pounds, 10 pounds, you get really hungry. And it's our... Our brain is responding to, "I'm not sensing leptin anywhere." And it wants you to eat more. And it wants to bring it back. So, fat has enormous functions in our body. It's not just a reserve of calories, although that is one of its roles. It actually functions in so many other ways.

SHAWN STEVENSON: And that was the first time that leptin was discovered. And I love the story that you shared. Because as it was getting towards the end, I was like, "Is this leptin, is it leptin she's talking about?" And it was... In relationship, they were utilizing these... They're called ob mice.

DR. SYLVIA TARA: Oh ob and db mice. Yes. That's right.

SHAWN STEVENSON: Yes. So ob and db. And I think it was like ob/ob.

DR. SYLVIA TARA: Yes.

SHAWN STEVENSON: And then you shortened it. And... Because they were trying to find out what is... And this is in humans as well, now we know that some folks literally, they have a mutation where they cannot control their hunger.

DR. SYLVIA TARA: That's right.

SHAWN STEVENSON: And we look at people and just point the finger and just say, "You're just... You don't have discipline," And sometimes it actually, if they're not producing leptin, you're ravenously hungry...

DR. SYLVIA TARA: Yes.

SHAWN STEVENSON: And the discovery of leptin is, and what we talk about, and even I've talked about many times, is in relationship to being a society hormone, but thank you for sharing that because it also is involved in your bones...

DR. SYLVIA TARA: Yes.

SHAWN STEVENSON: It's involved in your reproductive system, and people that have this mutation or even these mice, smaller brain size is one of those things, so that's why, just one of the reasons fat's so important is fat can talk.

DR. SYLVIA TARA: It can talk, it talks to your brain and it's good you brought that up because there's a direct link to your hypothalamus, it talks to your hypothalamus and it says, "Okay, we're good here, we have nutrition, we have enough fat, all's good," And so when you start to lose fat or you have defective fat, like the character I talked about in the book, the patient I talked about in the book, if you're not getting that signal to your brain, you get ravenously hungry, and Layla was the patient I talked about where she had defective fat, her fat wasn't producing leptin, so her brain was never getting a signal that she was satiated and she actually...

SHAWN STEVENSON: That's poor little girl, that's just a really tough story.

DR. SYLVIA TARA: Poor little girl, she was going through the trash looking for food, 'cause her parents were trying to restrict it, and she would break into a locked freezer, break into cupboards, go through trash, she could not stop eating.

SHAWN STEVENSON: She was eating frozen raw fish.

DR. SYLVIA TARA: Yes, yes.

SHAWN STEVENSON: Like Gollum from Lord of the Rings.

DR. SYLVIA TARA: That's right. It's not even what you eat, doesn't even have to taste good, they just need to keep on eating. Once they figured out, this was a discovery of leptin, once they figured out that she was leptin deficient, she had a gene mutation, they could inject leptin into her, and she stopped eating. It was that magical, that quick, and she was now a normal young lady.

SHAWN STEVENSON: And also seeing change in behavior...

DR. SYLVIA TARA: Yes.

SHAWN STEVENSON: It brought forth the maturity as well of the brain.

DR. SYLVIA TARA: Yes, that's right.

SHAWN STEVENSON: Wow, leptin is super important, and your fat is super important because that's where leptin is coming from.

DR. SYLVIA TARA: Yeah, so I think The Secret Life of Fat, it helps you respect your fat, your fat has a role, like I said, it's not just calorie reserve, it actually has a very important role in your

body, and so when we try to lose it, your body fights back, it wants to keep it on, it doesn't want you to lose it, and so you have to really understand your fat to control your fat, otherwise you won't understand the changes you're facing in behavior, your hunger, what it feels like why your body is wanting this back, and I think what the book helped me do is I didn't become so much of a yo-yo dieter anymore, I've been able to keep it off because I understand why I'm having this feeling, why I have this urge to eat more and it led to a number of different strategies as far as behavioral strategy, just seeing it through to the end. I think I get very determined once I finally figured out what fat was doing to me.

SHAWN STEVENSON: Yes. And we'll talk about some of the... What do we do here in a minute, but I want to really, I want to go back a little bit and talk about the basic, and this is something similar to what I was taught in university setting about the role of fat, but I love how you talk about it in the terms of currency, and this is something I would relate to other things as well, when I talk about things like insulin things like that, but I love how looking at, we've got glucose, glycogen and fat. So can you talk about that relationship as far as thinking about it in terms of currency.

DR. SYLVIA TARA: Yeah, sure. There's different ways your body gets energy when it needs it. One is when you eat, right away you get some glucose in your blood. That's cash. It's quick, it's in your blood, you can use it very, very quickly, after that it gets stored into glycogen, that's another storage, and it can also get stored into fat. Now, glycogen is in your muscle cells, it's in your liver, it's like a checking account, so it's not right there, it's not right, it's not cash in your pocket, but you can easily write a cheque and you can give it out. So, your body has a little bit of work to get it out of the cell and it produces glucose. Now fat is like a certificate of deposit, so fat is when you've... All the glucose is now going to get converted into a fat molecule and stored away for later use, and that fat is harder to get to, that source of energy is harder to get to, it's like it's not always there right away when you need it. Your body will go for glucose first, it'll go for glycogen also, and then if you really need it, it's going to go for your fat, and so when we try to lose that fat, you can imagine it's hard because your body is first using the glucose and glycogen and only when it really needs it is it going to get into that fat and help you lose it.

SHAWN STEVENSON: I love that so much, a body is so sophisticated to have those currency systems, and so it's just logical as well, having that cash on hand to do instant processes, but when there's too much on hand, we don't want to just walk around with these stacks of cash, we're not the Migos, for people out there who know some of these entertainers that just carry this insane amount of money around, but for a lot of us, we're going to store it as safe keeping and use it as needed, and then we've got fat, which is harder to get to, your body is going to use the glucose, glycogen and then go through that effort to get there, and so we want to... First of all, one of the basic thing is let's not get into a place where we're storing too much and

these certificates of deposit, but we'll get to that in a moment, and so when thinking about this differently and how we're consuming food and storing energy and then using energy later, but it's just a really interesting mosaic of the body's capacity, so...

DR. SYLVIA TARA: Yeah, and it's also really good that we're storing fat because if you have too much glucose hanging around or too much glycogen or too many lipids hanging around and they have no place to go, they start to store in places they shouldn't be, like your heart, like your liver, like other places, and so actually the fact that our body is putting these away and storing them, sequestering them into our fat is very healthy for us. In fact, there are some people who don't store fat very well, and these extra nutrients float around quite a bit, and I wrote about one patient named Christina Vina who had this problem, she couldn't properly make fat, and her liver was about multiple times the size it should have been 'cause things were getting stored into her liver because she couldn't store it into her fat, and so our fat's really important, be thankful you have it, and even when you're getting fatter, be thankful you are, because if you weren't, it'd be to be floating around in your heart and your liver, in your blood and other places where it shouldn't be.

SHAWN STEVENSON: Yeah, body's so amazing, and with that, bringing up the liver, there was a time when experts, physicians, researchers thought that the liver was the primary, if not the place making fat, and since then, obviously new data and thoughts have evolved to know that fat can actually make itself.

DR. SYLVIA TARA: It can, I think still there's a lot made by the liver and some of the fat in your diet is deposited right into your fat cells. And yes, so the third element is that. So, we're learning about fat and really the obesity epidemic in a way helps because more NIH money went into fat research and understanding what to do with it. And so, I think the more it's a health problem, the more research goes into it, and it's becoming very interesting on how we... How about we're learning about fat, what it really is and how to manage it. And I think most interestingly is that everyone's fat is not the same. People have a different metabolic profile, different genetic profiles, and you have to really understand your fat. My fat is not the same as yours, mine is... I have a very stubborn form of fat that it takes a lot to get it off, but gender will make a difference as well, the bacterial distribution we have in our gut will make a difference as well as viruses. So, the important thing is to understand your fat and your body and how you best can manage your weight.

SHAWN STEVENSON: Now, in that segment, Dr. Tara talked about the critical aspect of leptin and our satiety hormones that are really regulating our sense of satisfaction and satiety in the world. Without proper management and cohesiveness of these powerful hormones, we can be in a state where we are ravenous all the time, where it's very difficult to do anything but think about food. And there are people who are living in that state habitually, and we can thrust

ourselves into that state accidentally tinkering around with the wrong types of diets for us right now. And what I want to do is lean into the things that humans have been utilizing the longest. What are the compounds that help to regulate these key satiety hormones, and oftentimes, they're found in food?

Now, there is a specific fat that's been well noted to be of all the different types of fats that folks are consuming today, most associated with regulation of our satiety hormones, specifically leptin. A randomized double-blind study published in the International Journal of Obesity and Related Metabolic Disorders put participants on a reduced calorie diet that included either supplemental MCTs, medium change triglycerides, or supplemental long-chain triglycerides or LCTs. After the data was compiled, it was revealed that the group who included MCT oil lost more weight, eliminated more body fat, and experienced higher levels of satiety. The researchers noted that MCTs are able to boost the oxidation of stored body fat while increasing satiety at the same time. That's incredibly unique for a nutritive compound to be able to have that kind of impact.

So, this is something I have on pretty much a daily basis, I utilize MCT oil, but the quality always matters. Where you're getting these things from, matters more than ever. There's not much regulation for nutritive products, especially in the supplement realm, and a lot of folks don't realize that. So, you want to make sure that your sourcing is right, and you want to make sure that it's not cut with other unsavory oils and the like. So, this is where I get my MCT oil from Onnit. Head over to Onnit.com/model and you're going to get 10% off their incredible MCT oil, and also their emulsified MCT oil. That's O-N-N-I-T.com/model to get your hands on their incredible MCT oil. This is something easy to add to your tea or coffee or smoothies, even salad dressings, so many great ways you can implement these MCT oils that are derived from coconut source. And again, has a remarkable impact on supporting weight loss while also helping to support satiety. Again, that's Onnit.com/model. Next up, we have an important insight on the role of body fat that most people don't know about, which is the storage of environmental toxins.

And to articulate this, I've got on New York Times best-selling author, Dr. Alejandro Junger to tell you more about it.

DR. ALEJANDRO JUNGER: Especially in America, there's a problem with obesity, and there's a lot of reasons why, and they talk about diabesity and all the metabolic alterations that lead to that. But very few people are talking about one factor, which is that the body only knows how to adapt and survive. It doesn't have a code; it doesn't have a genetic information on how to get sick. So, when you see the body accumulating fat and retaining fat and generating fat, there must be a reason for it. And one of the reasons is that 90% of the toxins that we're exposed to through the air we breathe, the water we drink and shower with, the medications

we consume, the cosmetics we apply on our skins, but mostly through the food-like products or edible products that we are eating as foods, they're loaded with chemicals. 90% of which are only lipophilic, meaning they only dissolve in fat. So, let's follow the journey of a lipophilic molecule that comes in through one of these sources, goes into your circulation, whether it's through the skin or through the gut and then start circulating and eventually passes through the liver.

Now, if things are working well, the liver will detect it, will spit its enzymes that will cut the molecule and alter its composition, its chemical properties, and transform it, bio-transform it from lipophilic, from fat-soluble into water soluble. The reason it does that is because the body can only eliminate things through water, we don't sweat fat, we don't pee fat, we only pee and sweat water and also water is in the feces, so we need to bio-transform these molecules from lipophilic into hydrophilic, into water soluble in order to be able to eliminate them. Now because the liver is overwhelmed, lacking nutrients to manufacture those enzymes that cleave those molecules, then these molecules will remain. Some of them remain right there in the liver and the liver starts doing what? Buffering their irritation by accumulating fat and therefore leading to fatty liver, which is now becoming a huge problem.

The other ones will continue circulating and then will start lodging themselves in fatty tissue, brain, thyroid, breast, prostate. When you look at where the surge in cancers are, it's in those organs, so the rest of the fatty dissolvable molecules that have not lodged into a tissue, then the body will retain and generate fat in order to buffer their irritation, leading to obesity. So, obesity really... Part of the cause behind it, the root cause is this overload of lipophilic toxins that we are not able to process because of all the reasons we just spoke about.

SHAWN STEVENSON: That's remarkable. So essentially, this is an adaptation.

DR. ALEJANDRO JUNGER: It is an adaptation and survival mechanism, which is really the only thing the body knows how to do, what we see and perceive as diseases are just adaptation mechanisms here.

SHAWN STEVENSON: Because... And I heard you say this before, there really isn't a disease program in our DNA, it's really about adaptation, and so epidemics of obesity, of liver disease is... It's now in the top 10 causes of death in the United States, and it's just not being talked about, and the liver is so remarkable, it's responsible for countless processes, and it's responsible for also drug metabolism, for supplement metabolism, for anything that we bring into our bodies and also the things that we're exposed to, and obviously it's overburdened today with our environments, and you said something... I want to point this out. You said food-like products. Why did you say food like products?

DR. ALEJANDRO JUNGER: Because we're not eating food anymore, you go to the supermarket and take a bird's-eye view, what comprises 90% of the stuff that people eat, everything that's in the supermarket, in the middle of the supermarket, in shelves. And in order for things to be in shelves, they have to have preservatives, conservatives, and then on top of it, they have coloring agents and smelling agents and texturizing agents, so that they call your attention and they hook you into consuming them more and more, all these chemicals cause their damage, but what you see is that these products, they have a food or two as one of the ingredients, they're not really foods, the foods are in the perimeter, the vegetables, the fruits, the fish and the meat, but that's less than 10% of what's available in the supermarket.

SHAWN STEVENSON: In that clip, Dr. Junger is sharing such an important understanding about body fat that's overlooked today, our body fat is really functioning in a way that is constantly trying to support our health, trying to protect us in many ways, and we're faced with very abnormal conditions, being subjected to environmental toxins that the human body is never associated with, and also when we talk about environmental toxins, of course, we're talking about what we bring in from the external world into our bodies in the form of food or as Dr. Junger articulated food-like products.

So this is one of those other leverage points for us to understand our body fat is sticking around because it's trying to protect us, and we need to create conditions to where our bodies can safely release these toxins and also metabolic waste and get them out of our system, so that we can then shift our body fat ratio, but they're going to be sticking around if they've got to do what they've got to do to be your bodyguard. So, what are some things we can do here? This is why exercise is so remarkable, it's not just for trying to get the fitness aspect, it's for detoxification, it's for eliminating metabolic waste, is a primary mover of things out of your body is moving your body, so exercise being able to break a sweat, sauna's great, but most importantly, you also want to avoid exposure to toxicity in the form of low quality food to the best of our abilities. Alright, next up, we've got a little bit more on our various fat cell communities from Dr. Sylvia Tara and also, what it means when good fat goes bad.

DR. SYLVIA TARA: The subcutaneous fat is that fat right under your skin, so like in your arms and your legs that's under your skin, fat stored underneath. There's also visceral fat, which is that fat that can be stored under your stomach wall, right, so two types of stomach fat, one type of stomach fat, is that under the skin, subcutaneous stomach fat, and then there's a visceral fat, and some people get this underneath the stomach wall. Now, visceral fat can be very unhealthy because it gets close to your pancreas, it can cause inflammation, and so that's the kind of fat you definitely want to lose, people can be fat but fit, if they mostly have subcutaneous fat. The ones that's stored under your gut that's when you... To correlate it with diabetes, it's correlated with heart disease, and I do talk about...

SHAWN STEVENSON: Cancer.

DR. SYLVIA TARA: Cancer, that's right. And I do talk about Sumo wrestlers in the book also because they're a fascinating case of fat but fit. So, sumo wrestlers exercise for six to eight hours a day, they're actually very, very fit, and believe it or not, they don't have visceral fat, all that fat you see on a sumo wrestler is right under the skin, is subcutaneous.

And interestingly, when they get off the sumo regime, when they retire, they get metabolically unhealthy very quickly, although throughout their sumo career they were healthy, they didn't have metabolic disease, and it turns out that exercise is associated with a hormone called adiponectin that actually controls how much visceral fat you get versus subcutaneous fat, and because they exercise so much sumo wrestlers, they have high levels of adiponectin and they don't have visceral fat. And so that's how you can be... It's always best not to have too much fat, but if you are going to have extra fat, better to store it in your subcutaneous area rather than the visceral area.

SHAWN STEVENSON: Awesome, so, so insightful. And so, you mentioned... So, we got the visceral fat, and the first time I heard about visceral fat was, it was called omentum fat, which is... I think it might be Greek, meaning something like fatty apron or something like that.

DR. SYLVIA TARA: Yes.

SHAWN STEVENSON: And now just understanding... So, we've got that, but now we know about brown fat, brown adipose tissue or BAT for short. Let's talk a little bit about that.

DR. SYLVIA TARA: Yeah, and that is... It's actually good fat to have. So, BAT actually has a dual role, it does store some energy, but it's also responsible for producing heat. So, most of our white fat, and there's two types of white fat that's visceral fat, and subcutaneous fat that we talked about, but then there's brown fat that exists around your clavicle, around your back and your heart. And it actually burns energy. So instead of just storing energy, it's burning energy to produce heat. And there are some interesting experiments now to look at injecting brown fat into white fat to help people lose weight because it's actually burning off energy. And there's ways to get brown fat, and one way is to swim in cold water, and interestingly, when I wrote this book and did this research, I told my husband about it, and he started swimming in our nearby pool, a freezing cold pool every morning, and he's already a skinny guy, but he got almost emaciated just because I think he was burning so much calories from the swim, and I think he was increasing his brown fat and he ended up eating just tons of calories while this was going on. So, it's a good fat to have, and there are ways of getting more of it.

SHAWN STEVENSON: Yeah, I love that example of... And he's eating a lot. You hear stories of people like Michael Phelps, who's eating 12,000 calories a day. It's because... And if you just compare the movements that he's doing to somebody who's not in a pool, he's not burning that much, it's because the pool itself is adding that X-Factor, and so we have the cryotherapy and the cold thermogenesis and all that stuff, and we'll put a link in the show notes for everybody. I did a masterclass on this a while back.

But another way we talked about before the show, potentially is helping to support your body's production of melatonin, which has been found, this was in a journal Obesity Reviews, that melatonin... First of all, there's 400 times more melatonin in your gut than in your pineal gland...

DR. SYLVIA TARA: Interesting.

SHAWN STEVENSON: Which... I was taught this in school, it's in your pineal gland, end of story. It's nuts. But they found that melatonin increases the production and mobility of this brown fat, which is really cool, and the reason it's brown is that it has so much more mitochondria, it's like super dense in this energy power plant in our cells, it's nuts. But you talk about beige fat as well. So please talk about that because that's the first time I've seen it in a book.

DR. SYLVIA TARA: Yeah, that's a newly discovered type of fat, and that's fat that's capable of turning brown. Isn't that interesting? So, it's hanging around and our body often has these kind of sleeper cells, like stem cells that are waiting to see what the needs are at the moment, and they're capable of turning into things as you need to. And beige fat can turn brown, and one of the triggers that makes them turn brown is actually exercise. They have a protein called ricin in them, and when we exercise, they can turn into brown fat, and so it's being researched now. It's pretty new, but just know, you can increase your levels of brown fat by exposure to cold, by cold swims and by exercising as well, so exercise. I write about it and I think it's a good tool. Most of weight management is about what you eat, but there is a part that what exercise can be very, very helpful, just to make sure not to trigger a huge hunger reflex.

SHAWN STEVENSON: Alright. That's the thing.

DR. SYLVIA TARA: Which we'll get into. Yeah.

SHAWN STEVENSON: And I think that comes with stressful exercise, just like chronically stressful. Exercise in and of itself, it is a harmony stressor, but when it just becomes chronic, like you're trying to out-exercise your other issues, and then we miss out on these benefits because we've just become so sympathetic dominant, so totally nuts. I'd love to talk a little bit about... And this was just so beautiful that you... Again, this is stuff that's out there, but to put

it in this book all together in one place was so refreshing and so good, and how fat literally holds us together, it holds our cells together, so please talk about that.

DR. SYLVIA TARA: Yeah, we always think about fat as just the fat in our thighs or butt or stomach, but it's actually integrated throughout your whole body, so every cell has a membrane and, in the membrane, it's made of fat, and that's what holds your cells together. Our nerves have fat around them, myelin, it's mostly fat, and that's what helps our nerves conduct. Fat's used as a messenger, there's carcinoids or fat molecules that are used for short-term messaging within our body, so there's so many different types of fat in your body, and we get fixated on the white fat that makes us look not good, and again, a lot of that is because of the dieting industry we live around putting such a laser focus on our fat and why we should be worried and why we shouldn't have it, and why we need to buy 10 different products to get rid of it, or different books or programs, and it makes us fixate on one type of fat only, but it's critical as we talked about earlier, it produces hormones, leptin, it produces estrogen as well, fat.

SHAWN STEVENSON: I was just going to ask you about.

DR. SYLVIA TARA: Yeah, and as women get older and the ovaries stop producing estrogen, they actually depend on their fat for estrogen, it's a messenger, it holds their cells together and helps our brain conduct signals, so love your fat, that's one of the lessons of this research, is love your fat.

SHAWN STEVENSON: Yes, and I'm sure that was just a huge revelation for you.

DR. SYLVIA TARA: It was.

SHAWN STEVENSON: Going through the process.

DR. SYLVIA TARA: Yeah.

SHAWN STEVENSON: Wow. So, I want to talk about... You got these really cool sections and how... It's like a good girl gone bad but it's like, good fat goes bad. And this is something that we can start to pay attention to and to influence.

DR. SYLVIA TARA: Yeah, sure. Fat in excess, massive amounts of excess is not good, so fat that turns into visceral fat that starts to deposit in your visceral area that is not good, that is a fat that causes inflammation signals to be admitted, it's the fat that is correlated with diabetes type two, and it is also the fat that's correlated with heart disease, so a normal amount of fat

is good, fats, subcutaneous, if it's stored in your arms and legs and under your skin can be quite healthy, and we need our fat for all the reasons you just mentioned, the brain size.

Our immune systems rely on fat, our reproductive systems... Our happiness, our emotional state relies on fat, as well. But then when you get too much, it starts to deposit in places where it shouldn't, then that becomes a problem. And that is good fat gone bad, so we want the good level, we don't want it being excessive and we don't want it underneath our stomach wall. We want to keep it at a healthy amount.

SHAWN STEVENSON: Alright. To close out this compilation, dedicated to The Surprising Science of Body Fat and how fat loss actually works, that's what we're going to focus on now. We're going to talk about how the process of fat loss actually works and some things that you can implement to support the process along the way... Now, a lot of folks don't realize this, but it's estimated that the average lean adult male stores about 130,000 calories in fat on their frame. Alright? 130,000 calories in fat stored on the average lean adult male. And that is enough energy to sustain life for the average person for approximately 65 days, right? 65 days. Now, excessive fat storage, obviously, can be unhealthy, it can be problematic, this can bump into issues with performance and with confidence and all these other aspects of psychology that come into play. But most importantly, we're talking about health, and having a foundation of health. Seeking to be healthier, can have an out-picturing of changes to our body composition, and the things that we would attribute towards having a healthy physical culture.

Now, with that said, once we start to venture into obesity, we'll be storing hundreds of thousands more calories in fat on our frame. Tremendous amounts of energy. And again, an average adult male, that's 65 days of energy... Just imagine how much energy is stored once we venture into that domain. And coming up from the environment that I lived in, most of my family was obese. And this is just what was a norm, coming from where I'm from.

And part of the reason that I do this work that I do is that I love my family. And there's so many good people. We just didn't know. We didn't have this education. We didn't know how any of this stuff worked. The distance of our knowledge would range from our eyes to the television screen telling us to do a SlimFast shake if you want to lose weight. Alright? Shake for breakfast, one for lunch and a sensible dinner. Since... What is sensible? What does that even mean? Sensible for who? There's a lot less sensibility today, alright? But that's the scope of our education, we don't understand how these processes work. And I want to empower people to understand how our bodies work and how powerful food is at driving and controlling these processes.

And the process of withdrawing the energy from your fat to use it as fuel, is often referred to as lipolysis, right? Lipolysis... And the process of storing fat in your body is often referred to as

lipogenesis, right? Lipogenesis. Now remember, with excess energy coming in, you're generally not making new fat cells, you are filling up the fat cells with more and more moolah to use if the situation ever called for it. But the big takeaway from this is that your body works on a hierarchy, right? It's kind of like accounting.

So, another class from college that I took that bared out in different ways, but it's going to bare out for me, beneficial, not from what I thought it would, but in the realm of nutrition, it was LIFO-FIFO. That's last in, first out and first in, first out. And with your body fat, it's working on a hierarchy of needs, with the utilization of energy. The last in is the first thing to get used, alright? What's already stored, is stored body fat, and that's what we're typically targeting... We want to just use some of this energy that's hanging around on my body. But even though we've got all of this caloric energy, this stored energy in the form of fat, your body is going to...

In comes another meal. In comes another source of nutrition. In comes another source of glucose... It's coming into the body, it's going to be the first thing to get used, because it's easier. Alright? Your body is working on that hierarchy. Once that's not coming in, then it can shift over and start using some of that stored glycogen. And then, it can finally start to burn through some of the stored body fat. So, it sounds like an arduous process. Now, keep in mind there are ways to supersede and get to that stored fat faster, alright? That's all in eat smarter as well. But these are different things, through our nutrition and our lifestyle, that enable your body to go and snag up some of that stored fat a little bit quicker. But most importantly, if we're looking through the lens of prevention and not storing excessive fat in the first place, it always makes the process easier.

Alright? So, I want to empower you, so you understand how all of these steps work, alright? So, if we want to get to that stored fat, that stored energy, we've got to have processes in place that encourage the process to happen. And also, if we feel nourished and we're not constantly putting more food in, because you think about it, if we're storing hundreds and hundreds of thousands of calories in fat on our bodies, so much energy that we can survive for months... On paper, on paper. Alright? Why on Earth would we still be hungry? Why will we still be hungry? And one of the big takeaways that you find out as you go through Eat Smarter is that chronic nutrient deficiency leads to chronic overeating. Chronic abnormal activity of your hunger and satiety hormones, leads to chronic overeating. These are all things that need to be accounted for that are controlling your behaviors, that are controlling what these metabolic processes are doing.

It's so much bigger than this calorie-focused paradigm of nutrition that has largely failed our society today, and so again, we're putting the power into your hands, now you understand how this process works, getting a fat bank account, basically, and now that we know how the energy

is getting stored in the fat cell, let's talk a little bit about how we're going to move the fat out of the cell.

Now, in Eat Smarter in order to understand how this process of fat loss works in a really digestible way, pun intended, big pun intended, shout out to big pun, don't want to be a planet no more. But to understand how this process really works in a digestible way, in a way that makes sense, it's really getting to the really powerful tenet of education, which is taking something that we don't know and connecting it to something that we do know, that's what learning really is. It's taking something that we don't know and connecting it to something that we do know. And so, what I use is analogy to understand how the process of fat loss works is going to the movies, or going to see a play, and we use this paradigm of a metabolic theater, where all of this action is actually taking place.

Now in this metabolic theater, in this domain of the fat cell itself, where you're watching your favorite movie or you're watching your favorite comedian or favorite stage play, it's all happening in the fat cell itself. It's where some magic's happening. Now in order for the fat cell to get stored with energy, and that process of ushering in energy into that cell, there's a couple of key enzymes that are involved in all of these processes. So, we talked about the process of what actually constitutes the stuff that fat cell's getting stored with, which is the triglycerides. Three fatty acids combined with one glycerol, and so those are getting shuttled into the cell by the boss in charge of all the ushers, telling everybody the theater's open, come on in, have a good time.

And that's insulin. Insulin is opening the doors to the metabolic theater and allowing that fat to get stored. With the assistance of certain enzymes, There's enzymes like lipoprotein lipase that are involved in moving fatty acids around to different domains, but in particular now, when talking about fat loss or ushering the fat out of the fat cell we're talking about the enzyme called hormone-sensitive lipase or HSL. Hormone-sensitive lipase. Now, hormone-sensitive lipase is like the little usher that's there to help move fat out of your cellular theater after the show is over. And again, without them, without hormone-sensitive lipase, and there's others as well, there's mono-glyceride lipase, there's adipose triglyceride lipase, but hormone-sensitive lipase is kind of like the leader of their little... Within any little click at a job, there's like somebody who's kind of like the leader, even though they don't got the title necessarily. Alright, so hormone-sensitive lipase. And it's responsible for the mobilization of free fatty acids from adipose tissue is triggered this process of lipolysis by hormone-sensitive lipase and it's easily acted upon by hormones that we...

It's called hormone-sensitive for reason, hormones that we can influence, can help hormone-sensitive lipase to do its job more efficiently and effectively. And moving onward, if we have excess fat that we want to lose, we want hormone-sensitive lipase and his buddies to be

clocked in on the job and ready to put forth their best efforts. And now, even though hormone-sensitive lipase is the head usher I charge of getting fat out of its seat, there are some other bosses who actually write their checks, and these are the managers of their departments, and their bosses are the twin brothers, insulin and glucagon, not identical. And they're both from their loving mother, Miss pancreas. Now, even though they're brothers they have two very different personalities. Insulin is more calculating, careful, always wanting to save up and stockpile because you never know when you're going to need it. It's all about safety and security. And he wants to keep the attendees in the seats, keep the fat cell theater full and out of the isles, by the way, which is the blood stream. Out of the aisles in the fat cell. And glucagon, on the other hand, is really more of a free spirit in many ways, it believes in minimalism, we just use what we use.

We just have what we need, and that's what we need. Now. Just to be clear, according to the Journal of Lipid Research, glucagon does have some influence on activating hormone-sensitive lipase, but hormone-sensitive lipase is primarily activated when insulin just sits its butt down. That's the primary trigger for hormone-sensitive lipase to do its job of getting folks out of the theater is when insulin goes and takes a nap somewhere, it just goes and relaxes. That's when hormone-sensitive lipase is actually able to kick into gear. Glucagon is more specifically there and primarily producing and promoting hepatic fatty acid oxidation, so oxidation of fat in a liver. So that its primary job that it's doing what's noted in the data. So, glucagon, so many of these things we're just beginning to understand, but many of these things we've had data on, but it's just becoming more and more expansive. Again, insulin, glucagon and hormone-sensitive lipase all take proactive jobs at managing the doors of the cellular theaters and allowing fat in or out of the cells. And one of the biggest takeaways from today, and something that really allows the mobilization and activity of hormone-sensitive lipase to do its job is glucagon's close friend he can pass off the keys to named adrenaline. Adrenaline, also known as epinephrine, his teachers at school called him epinephrine, that's his proper name, but his friends call him adrenaline.

I just thought about Fast and Furious, the Vin Diesel adrenaline. One quarter mile at a time. Adrenaline loves to get fat out of the cellular theater, loves to get everyone cleared out so they can go and kick it at the after party. When the show is over, hormone-sensitive lipase and other ushers are really motivated to get fat out of the cell once adrenaline is around, but again, the primary activator of hormone-sensitive lipase and ushering the triglycerides out of the cell, like policies, breaking these fatty acids down to be used for energy is simply by allowing insulin to stop roaming around, and insulin is going to be on guard on job whenever food stuff is coming in, particularly sugar, particularly high carbohydrate-based foods, just gets insulin being like that... That that... The helicopter parent that... That that... A passenger seat driver, that overbearing manager, just hovering over, constantly working too much.

So, as we move away and to employ some of these practices that we'll talk about and also again, much more in-depth, any smarter, even the cellular theater is much more in depth. We talk about in the book, but I'm just giving you the rudimentary understanding of how this process is working... Okay, now that hormone-sensitive lipase is able to do his job, adrenaline is... Is able to trigger and support doing this job, which again, adrenaline aka norepinephrine. We think of it as just in these terms of being this quote stress hormone, but stress is not... This term stress is universally considered to be bad, but it's not... We, stress is a part of what makes us human, and allows us to grow and to thrive and to survive, we're experiencing stress just by being here on this planet, gravity is constantly putting pressure on our bodies, this is why if you've ever seen that movie or read the books around the story of John Carter.

I believe Disney did that movie, but when he went to another planet and all of a sudden he's light as a feather, he's bouncing around and he's able to do all these crazy things, his body's been exercising getting stressed by gravity, just the nature of being here on this planet and the stress of movement and all these processes taking place, the stressing of exercising, which is incredibly beneficial for our metabolism, all these things are hormetic stressors, so just say stress is bad, is... A really terrible over-simplification. And just to be clear though, stress can really mess you up, excessive stress, but we need stress in order for our body to do all the cool stuff that it can do, it just needs to be in balance. Alright, now, this is very important. When we're talking about burning fat, when we're talking about "burning fat" we just talked about policies, that's the freeing of the fatty acids from the fat cell.

That's like policies that is not "burning the fat" like policies is a process of fringing the fat from the cellular theater, but it's actually burned for energy by your mitochondria at the cellular snack bar, that's where it really goes down, your mitochondria are really the energy powerhouses of yourselves, and the universal currency that your body is using called adenosine triphosphate or ATP, is which our mitochondria is making... When it's taking that fat and "burning it" that in destination of the fat being free from the cell, the free fatty acids being freed and actually leaving our system "burning fat" happens in the mitochondria, it's a process called beta-oxidation, all right? Because lipolysis is just breaking down fat to use as fuel, that's not enough, that's not burning fat. The majority...

Listen to this, this is incredibly important. The majority of fat-free through lipolysis is re-absorbed. Lipolysis is in it. Of course, it's important. It's a step in the process. A study publishing endocrinology and metabolism, cover that 70% of released fatty acids are reabsorbed, they are reabsorbed. Who knew? This process of re-esterification is when the free fatty acids recombine with the glycerol and it's going to get stored in a fat cell, it's going to get stored and used for later Energy, and it says quote 70% of released fatty acids are re-esterified at rest, and this value decreases to 25%, so we go from 70% of fatty acids getting re-absorbed to only 25% of freed fatty acids getting re-absorbed within the first 30 minutes of exercise. When

you exercise, it's unlocking some magical power seemingly and actually moving the fat out of the system, all right? In exercise, more than one half of the increase in fat oxidation could be attributed to the reduction in the percentage of re-absorption, okay, so it's not just your burning fat through exercise, you're not re-absorbing the fat that's already been released.

So, I hope that makes sense. Now, these mitochondria are powerful, these are mighty, mighty entities in our cells. You can have hundreds, even thousands of mitochondria in a single cell, as a matter of fact... Just a little fun fact for you. Approximately 10% of your body weight is mitochondria. What?

Alright, right. That's a Tweetable right there, that's a Tweetable. Your mighty, mighty, mitochondria, and truly a big part of this process is supporting the function of these metabolic Biggie Smalls, these metabolic Biggie Smalls are a huge key to supporting your cellular theater. Now, there's other bosses, there's other entities involved in this metabolic theater, like your thyroid gland, for example, and the thyroid is producing hormones that control your metabolic rate, the rate at which you burn energy, and the thyroid gland is closely connected to the brain and the gut, and so what's going on with those two things deeply impacts the function of the thyroid and signaling all of these different things to happen, and so we dive into that a little bit deeper and eat smarter, but I want to give you an overarching understanding of this metabolic theater and how this process actually happens, and once the fat makes its way to the mitochondria to be used as fuel and burn through beta-oxidation, where does it go? Where, oh where, has that little fact gone?

I think the closest approximation that people can think about, just rationally what we kind of see in the world, and thinking about fat being evicted from our bodies, is through the appearance of sweat. So, we think that our fat cells are having a good break up cry, and they're just leaving our bodies and it's a sad experience, they're sad to go, but you're happy to see it, so are we losing our fat through sweat or is there something else happening? As mentioned, when we attempt to "lose fat", what we're really attempting to do is to metabolize these triglycerides, again, triglycerides are comprised of three types of atoms, carbon, hydrogen and oxygen, and triglycerides can only be broken down by unlocking these atoms through the process of oxidation.

Now, here's how fat is able to vanish into thin air, a peer review study published in the BMJ where scientists decided to follow the path of these three atoms as they are leaving the body, they discovered that when 10 kilograms of fat is oxidized, 8.4 kilograms of that fat is excreted as carbon dioxide via the lungs, while just 1.6 kilograms was released as water, so in other words, approximately 84% of the fat you lose is eliminated through your breath when you breathe out, and only about 16% of the fat you lose is through sweat, urine and other fluids, even tears from your eyes, it's a little bit of fat leaving. These calculations revealed that the

lungs are the primary excretory organ for fat, plus if that weren't enough, the researchers estimate that about one-third of the weight loss happens as you breathe during a full night of sleep. So most of the fat, how it's vanishing into thin air, literally, is because we're breathing it out, this doesn't mean that breathing faster, doing the breath of fire, the chaotic breathing, is going to help you to burn more fat, that's not what it's about.

That's just an end point. It's the door leaving the body, that's all that is. All of this stuff has to happen beforehand, which largely relates to our nutrition and our lifestyle, so now that we have a really good rudimentary understanding of how the process of fat loss works, how our cellular theater is functioning, how we have different fat cell communities, how our fat cells are getting stored in the first place, now we're going to cover some of the specific foods and nutrients, and a way of eating, we'll start with that first, that supports this fat loss process that supports your fat loss related hormones and enzymes. But one of the most overarching nutrition principles is seen in the data, which is to simply keep insulin in balance, again, that's when everything is kicking into gear, the enzymes that do all these cool processes of fat metabolism, kicking it off, happens when insulin can sit down relax and take a break. So, knowing that insulin is largely triggered by carbohydrate intake and sugar... Not that any of these... Not that carbohydrates are bad...

We're not saying that, but we have a very carbohydrate-dominant society, and largely refined processed carbohydrates, and even once we get into the whole grains, we can take that too far as well, because that's what I was taught again in my conventional private, expensive university nutrition science class I was paid to be mis-educated, I was taught 7 to 11 surveys of whole grains, and my teacher was bordering on obesity himself, he was not secretly main lining, Cheeto dust and Pop Tarts. He was doing the thing that he was teaching, but because of the role that insulin plays, for example, with that carbohydrate coming in, it might be too much, and you kick into that process again, glucose, cash on hand, writing checks, over depositing in the glycogen in the liver and the muscles, and getting stored as certificates of deposit in fat cells. It can happen easily with the typical meal here in the US, and so what if we just shift this ratio a little bit, just shift the ratio. Since we know that the big driver of insulin, which dietary fats and proteins can also stimulate the activity of insulin, but not even remotely as close as carbohydrate and sugar can.

So, what do we do? How does this work? Does it work? A study cited in the American Journal of Clinical Nutrition revealed that simply lowering the study participant's ratio of carbs and increasing their ratio of protein without changing calorie intake. Please hear that, without changing calorie intake, led to higher levels of satiety, a higher resting metabolic rate and higher levels of fat oxidation, the fat actually getting burned without changing calorie intake, simply shifting that ratio... I didn't say, "No carbs."

I didn't say even "low carbs"... Could be, but just lowering that ratio, and increasing the ratio of protein to create a favorable change in the metabolism. Now, what if we take this tenet of simply shifting our carb ratio, just for one meal of the day, specifically to start the day, the first meal that you have, because you're "breaking your fast". Your body's metabolism is in a very influential state at that point. And this is conducted by researchers at St. Louis University and published in the International Journal of Obesity. They sought to discover what happens with fat loss when you eat a high carbohydrate breakfast versus a high protein/fat breakfast. When the calorie count of the meals are exactly the same. They stay the same, but just talking about the main macro nutrient coming in.

Now for the high carbohydrate breakfast. It's a breakfast that I've had many a day, many people have, for their breakfast. Bagel. Bagel, of course, you might be like, "Well, it's not a high-quality carbohydrate." Even if it's a whole grain bagel, we can get into nuance about this, but this is what's used in the study. And then for the high protein/high fat breakfast, it was eggs. Now, the researchers did have the study participants to decrease their overall caloric intake by 1000 calories a day in the study, but had different people use different macro-nutrient ratios, just for their first meal. And here's what they found after an eight-week study period. Even though the calories on the diets were the same, the study participants in the lower carb breakfast group, showed a 61% greater reduction in body mass index. A 65% greater weight loss. A 34% greater reduction in waist circumference. And a 16% greater reduction in body fat percentage, actual fat loss.

Calories the same, changing that macro-nutrient ratio, which influences insulin, which influences hormone-sensitive lipase and glucagon, and all the things we're talking about. This is a tenet that we can take advantage of. Does this mean you can't have your favorite breakfast, even if it's a higher carbohydrate? No, this doesn't mean that. You can do what works for you, what feels good. But for some people, this might be like, "Oh wow, I've been doing this thing this whole time and I haven't really been getting the results that I want. Maybe let me try shifting this macro-nutrient ratio." Because I promise you, any smarter you learn how to take advantage and enjoy your carbohydrates.

It's just how you... It's how you do it. It's not just what you do, it's how you do it. Now, I also today want to talk about and share some of the specific foods and nutrients that have some data, some really solid data affirming that it supports this process of fat oxidation. Alright, so the first one that I'm going to share is a food that a lot of people know about, but this is definitely going to encourage you to maybe add this in a little bit more. Foods that influence the genes themselves, that literally control these processes of metabolism, are truly remarkable. So, we're talking about the genetic programs, controlling what insulin does. Controlling what hormone-sensitive lipase does, controlling what thyroid hormone does.

Controlling what insulin does. Controlling what... Did I say insulin twice? Who knows? It matters if I say it twice, because it's twice as nice, insulin is important but adrenaline.

Determining what all of our hormones related to our metabolism are actually doing, can be really powerful. One of these remarkable foods, seen in the research, are blueberries. Researchers at the University of Michigan published data finding that blueberry intake can potentially affect genes related to fat burning. And a study published in the Journal of Nutrition showed that the consumption of blueberries was able to reduce insulin resistance in study participants. Now keep in mind, a consistent sign of insulin resistance is carrying around more visceral fat. This hyper-emphasizes your body when you're insulin-resistant to get that sugar out your blood stream, because it's not...

The insulin is not communing with the fat cells properly, and getting it out of the bloodstream, but there are certain departments that can really bear the brunt of the weight. Primarily increasing things like non-alcoholic fatty liver disease by storing more fat in the liver and creating lipogenesis there. And also storing it as visceral fat, right? So anything that we can do to improve insulin sensitivity is going to be a welcome friend to our waistline. Specifically, it's the flavonoids found in blueberries that are found to be protective against weight gain, according to scientists at Harvard University. So, best blueberries, wild harvested blueberries, fantastic. Blueberries, and there's a nuance here, fresh, frozen, dried. All these different...

There's many different ways. The most important thing is just to get some of this stuff in. Frozen is great, because some nutrients are retained even better. While you do lose some other things, so it just depends. Fresh or frozen, fresh, obviously, you could use it as a snack, you could use it in different dishes. Frozen is great for smoothies and snacks, and things like that. The list goes on and on. So many different ways to utilize blueberries, right? But that's one of those simple easy things to add in. A couple of berries a day, can keep the fat genes at bay. Alright, now another one of these powerful food sources, sources of nutrition that help to manage these metabolic processes, is something else that you're going to be familiar with, but we're going to dive a little bit deeper, and it's salt. Salt.

As you recall the pancreatic hormone, glucagon, promotes lipolysis by opening up the cellular doors to release stored fat for use as fuel, specifically really assisting in that process with the liver. Recent data affirms that sodium aides in the performance of glucagon. You want glucagon to be able to do its job intelligently, and salt also influences the action of leptin, adrenaline and thyroid hormone. You need salt for all of these things to do their jobs. It's incredibly important, but it's been demonized, and we'll talk a little bit about why, but a meta-analysis published in the Cochrane database of systematic reviews and covered that study participants placed on a low sodium diet did have slightly lower blood pressure in the short-term. That's what we think about when we think about sodium, we think about salt.

But they found that over time, the restricted sodium actually led to elevated triglycerides, the thing we're trying to eliminate, if we're talking about weight loss. Elevated stress hormones and accordingly, elevated blood pressure. Short-term, reduced blood pressure. Long-term created some problems. So, we need to be much more aware and conscientious in our management of salt. And I'm not advocating for a high salt diet, I'm just saying that we need enough of the right kinds of salt, high quality salts because according to the Journal of the American College of Nutrition, they estimate that at least 77% of the salt intake in the American diet comes from processed foods and not what you're adding from your saltshaker. This is primarily from low quality, heavily refined salt that typically contains additives, like anti-caking agents, etcetera, and is devoid of all other naturally occurring micronutrients and doesn't have the long history of use that real salts have, alright.

So, there's... A lot of folks know about Celtic salt, then Himalayan salt and Black Hawaiian salt and real salt, there's so many cool salts to utilize, you need salt. We need higher quality salt. We need to move away from the processed foods that contain this low-quality salt. Another important nutrient adjunct for improving this metabolic process when we're talking about "burning fat", this one's going to be easy, but are you doing it? Water. A peer-reviewed study published in the Journal of Obesity found that drinking adequate amounts of water can itself trigger lipolysis AKA the release of stored body fat. Water. Water, you sweet, sweet, wet... Never mind. And if that didn't perk up your ears enough, another study published in the Journal of Clinical Endocrinology and Metabolism found that drinking water can also increase your metabolic rate through a process called Water-induced Thermogenesis.

The reason that water is doing this process, is not because of just your body is heating the water up or whatever, it doesn't matter if it's cold water or hot water, that's not really what's making the big difference, it's the fact that water makes everything in your metabolism work better because here's just a couple of things that water is responsible for related to your metabolism. Water is responsible for the maintenance of your DNA, water is responsible for facilitating reactions in your mitochondria where fat is actually burned, water is responsible for the integrity of all of these different glands and tissues and cells that enable this incredible process of metabolism to take place. It's all happening in a water medium.

That's how important water is. So, are you getting enough? Is that a priority of yours, because we're looking for this magical thing to help us to lose weight and to burn fat. Water is the basis. Water is the basis. Alright, another thing seen in the data that actually helps to nudge, remember we talked about the different brown cell communities, beige cell communities, white fat cell communities, to nudge those beige fat cells into the realm of brown fat, give them a little bit of a nudge is actually the c-word that comes with some nuance here, but it's coffee. Coffee's been found to help to nudge beige fat cells into the brown fat cell domain and

activity. In one of the studies that we highlight in Eat Smarter researchers actually use FMRIs and looked at what happened in the body when folks drank coffee. And they saw the brown fat areas of the body lit up like a Christmas tree, but as with any of these things, there's nuance here in the quality. Where is it coming from? The amounts that we're using, all this stuff we cover in depth in Eat Smarter. But I wanted you to know that because it's not just about targeting the white adipose tissue, it's targeting the other fat cell communities that make all this magic happen as well.

Like the type of fat that actually burns fat for energy. Alright, another nutrient source that is pretty common, a lot of folks know about this, is highlighted in a new study that was published in the Journal of Translational Medicine, and they found that oleocanthal-rich antioxidant rich extra virgin olive oil can potentially downgrade the expression of the FTO gene associated with excess body fat and obesity. We're talking about that epigenetic influence, we're talking about Nutrigenomics here, how nutrition is affecting what your genes are actually doing. Nutrigenetics, all these things come into play here. The scientists found that in a four-week diet intervention that included high amounts of olive oil appears to have epigenetic influences that result in improved body composition. And it's not just the remarkable antioxidants and other phytonutrients in olive oil contributing to these benefits, but the mono-unsaturated fatty acids themselves sparking some metabolic benefits.

A meta-analysis of 24 studies found that a diet rich in mono-unsaturated healthy fats from whole food sources was able to reduce blood glucose levels and improve insulin sensitivity better than a standard low-fat carbohydrate diet for test subjects. Another study published in the International Journal of Obesity and Related Metabolic Disorders, pitted a diet with a higher ratio of fats, specifically mono-unsaturated fats, head-to-head against a low-fat high carbohydrate diet for overweight test subjects for 18 months. The test objects with the higher ratio of mono-unsaturated fats in their diet, lost more weight, lost more body fat, and lost more inches off their waist than the low dietary fat group. In fact, in this study the low dietary fat group actually gained in all those areas.

Fat is a big player in our metabolism. Healthy whole food-based fats. Some of the most popular sources of mono-unsaturated fats that have a dense source of mono-unsaturated fats, are nuts and seeds. Like almonds, Brazil nuts, cashews and pumpkin seeds. And also grass-fed butter, beef, duck, avocados, avocado oil, olives, and, of course, olive oil. So, there's nuance here with the olive oil, too. Of course, you don't want to get your proposed healthy source of olive oil that's coming along with pesticides and herbicides that's been used in the growing process. Alright? So, you want organic olive oil, cold pressed, extra virgin olive oil. And also, it should be stored in dark glass, because it's photosensitive, alright?

So again, more of that data is in Eat Smarter. So, I can go on and on. There's so many incredible foods and incredible nutrients that really help to guide and create more effectiveness and efficiency in our metabolism. Again, so many wonderful foods and nutrients that create the conditions for metabolic health in our bodies. It's important to remember that there isn't a "magical fat loss food". There isn't one specific food that's going to shift your metabolic health on its own. It's really about stacking conditions in your favor, with our lifestyle practices and also with our nutrition. Of course, there are certain foods that do have a higher leverage. However, you can utilize a really great fat-loss supportive food while simultaneously doing things that inhibit fat loss.

So, it's stacking conditions in your favor. And one other thing that I want to mention, specifically in the nutrition domain, that targets hormone-sensitive lipase that we covered today, which again is the enzyme that unlocks our fat cells, so that the contents can actually be utilized for fuel. There aren't many things that have been discovered that directly act upon that enzyme. But according to a study published in the journal, Phytonutrient Research, the traditional tea Pu-er, is one of the rare nutrient sources that has a direct significant influence on that enzyme that unlocks our fat cells. Also, we know how much our microbial health is influencing our metabolism today.

A recent study published in the peer-reviewed journal Nature Communications, uncovered that a unique compound called theabrownin, that's found in Pu-er, has some remarkable effects on our microbiome. The researchers found that theabrownin positively alters our gut microbiota and directly reduces excessive liver fat. And helps to reduce lipogenesis or the creation of new fat. Pretty remarkable stuff, but again, the quality matters. You want to make sure that you're not getting a tea that's also coupled with microplastics and heavy metals, and all these other things that are coming along in conventional teas that most people don't know about. The Pu-er that I use, uses a cold extraction process that is patented technology. A triple toxin screening of the highest level of purity as well testing for pesticides, heavy metals, toxic molds that are all common in teas, and most importantly for me, it's wild-harvested, which dramatically increases the concentration of polyphenols that are well-noted to have some of these cool effects that we're talking about, so...

This is from Pique Tea, head over to piquetea.com/model. That's P-I-Q-U-E-T-E-A.com/model. You're going to get an exclusive 10% off all of their incredible award-winning teas over at Pique Tea. Again, go to piquetea.com/model. Now again, we've got to make sure that education is paramount right now, so that we actually understand and relate to our own bodies and stop superficially treating things. We want to start stacking conditions in our favor, but awareness is the first domino. Just understanding how this stuff works, it starts to put the empowerment into our hands where it really is anyways, but we start to acknowledge that.

So really excited about this time and if you got a lot of value out of this episode, please share it out with your friends and family. You can send it directly from the podcast app that you're listening on. And of course, you can share it on social media as well, take a screenshot of the episode and tag me, I'm @shawnmodel. Let everybody know what you thought about this episode. We've got some powerful epic shows coming your way very, very soon, so make sure to stay tuned. Take care. Have an amazing day and I'll talk with you soon.

And for more after the show, make sure to head over to themodelhealthshow.com. That's where you can find all of the show notes, you can find transcriptions, videos for each episode. And if you've got a comment, you can leave me a comment there as well. And please make sure to head over to iTunes and leave us a rating to let everybody know that the show is awesome. And I appreciate that so much. And take care. I promise to keep giving you more powerful, empowering, great content to help you transform your life. Thanks for tuning in.