

**THE MODEL
HEALTH
SHOW**

EPISODE 442

**The Secret History Of
The Calorie**

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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. The calorie. No term has been more synonymous with weight loss and nutrition than this mischievous, metabolic landlord. At this point, hundreds of millions of people have tried to use calorie management to inspire weight loss, and according to a meta-analysis, a massive meta-analysis conducted by researchers at UCLA, only a small percentage, a tiny fraction of those folks using a conventional calorie-restricted diet are able to actually lose weight and keep it off. In fact, the researchers said that "Several studies indicate that dieting is actually a consistent predictor of future weight gain."

One study found that both men and women who participated in a formal calorie-restricted weight loss program gained significantly more weight over a two-year study period than those who had not participated in a weight loss program at all. So I want you to get this, dieting, following a conventional calorie-restricted diet is a better indicator that you're going to gain weight later than just about anything else. Something is clearly awry. In the counting of calories, something is blatantly not adding up. Now for myself, calories were the very first thing that I learned about in my university in nutrition classes. It was the kingpin, it was the monarch, the head honcho, the warden of nutrition, and I use the word warden intentionally because the misunderstanding of the calorie has led to millions of people being confined in their own metabolic prisons. Now, is the calorie simply a hard-working breadwinner just doing his job? Is it a scapegoat? Is it even a real boss at all? And it's been given all of this respect and credit and responsibilities that's just way above its pay grade and people are on the verge of really figuring out calories story behind the scenes and who's really in charge. Those are all things we're going to cover today as we venture into the history and science of the calorie from my new book "Eat Smarter."

So let's start at the beginning. The calorie is the currency that we typically use to describe the value of energy in different foods. It's the basic understanding of it. It has become a socially accepted exchange tool that we all use, but have you ever



asked yourself, "Where the heck did the calorie come from?" Ancient Egyptians, when they're walking like an Egyptian building pyramid, they weren't thinking about calories, it wasn't a part of the lexicon or the knowledge base, the very physical culture of the ancient Romans and many of the story traditions that we look at, and the amazing art and the love of the potential of the human body, they didn't study calories, they weren't looking at that, they didn't have that unit of measurement, so where did this idea come from? Well, the reality is, when the calorie first hit the scene in the 1800s, civilizations prior to that had really gotten along pretty well without it. In fact, no one was even looking for an energy measurement for food when it was discovered.

When the calorie was originally invented, it was used as a measurement tool in physics and engineering and had nothing to do with nutritional science. Now there's a little bit of controversy over who actually invented the calorie. Some references show two Frenchmen, PA Favre, maybe no relation to Brett Favre, and JT Silbermann, who invented the calorie in 1852, that's where some people give the credit. Other texts state that it was a German physician, Julius Mayer, who effectively invented the calorie in a study he published in 1848, prior to the two Frenchmen. However, the earliest records of calorie talk go back to a French chemist named Nicholas Clement, with lecture notes from Clement defining the term as early as 1819. Now again, when the calorie made its pivot into the realm of Nutrition Science because no one was looking for it in reference to food, this was in large part due to the work of an American chemist named Wilbur Atwater, and this was around 1887, Wilbur. From there, making its way into our popular lexicon, this was thanks in large part to physician Lulu Hunt Peters, who published an early nutrition bestseller called, "Diet and Health: With the Key to the Calories" in 1918.

This book was a smash hit, selling over two million copies, that is massive back at this time, and this triggered a huge change in society's beliefs about food. In it, Dr. Peters encouraged people to start thinking about food in terms of calories, for the first time in popular text, start thinking about food in terms of calories. She asserted in her book "Hereafter you were going to eat calories of food. Instead of saying one slice of bread, or a piece of pie, you will say, 100 calories of bread or 350 calories of pie." The shift to food as numbers have begun. And even back then, there was no real distinction made between the quality of different foods. Under her system, a person of the same height as her could eat whatever she wanted, as long as she maintained a strict diet of 1200 calories a day. It's important to note at this time, Dr. Peters also began the widespread

indoctrination of associating morality with food. Now, this is very important. In her work, she equated not being able to maintain one's weight as a character defect that needed to be fixed, the terms "Punishment" and "Sin" were now being used around food.

This was also the time around World War I, so food rationing was a commonality of the day, and it was insinuated that aggressively restricting calories was an act of patriotism. She stated, "That for every pang of hunger we feel we can have a double joy that of knowing we are saving worst pangs in some little children, and that of knowing that for every pang we feel, we lose a pound." Her diet could help you to show love for your country, help you feed hungry children, and improve yourself all at the same time. That's a hell of a groupon deal if I've ever heard one. For better or for worse, Dr. Peters was truly a pioneer in her own battles with her weight struggles, with her inspiration for her work.

Now, this is coming directly from my new book, "Eat Smarter," and we're really diving in and breaking down the various paradigm surrounding food and how it affects our metabolism. And some of the conversation that simply is not being had, because at this point here in the United States we have about 200 million people who are overweight or obese, and millions upon millions of people every single year get into a calorie-restricted program to try to lose weight, and there is value in monitoring and paying attention to calories, but the story is so much bigger, the history of the calorie itself is so much bigger and complex, and as you're going to discover today, there are so many different aspects of metabolism that influences what your body actually does with the calories you consume. So we're going to dig in a little bit deeper and talk about one of the sections in "Eat Smarter," and this is titled, "Burning stuff for energy."

So now we have this commonly accepted unit for measuring energy in food, it's called the calorie, but have you ever stopped to actually think about how accurate it really is? How accurate are those food labels telling you how many calories are in their food? Now, in scientific terms, a calorie is a unit of energy, just like a meter is a unit of distance. One calorie is the amount of energy you need to heat one gram of water up to one degree Celsius, and to measure the amount of calories in food manufacturers use something called a bomb calorimeter, and this process involves placing the food source in a sealed container and then placing that into another container that's filled with water. They would then burn the food with electrical energy until it completely incinerates, and afterward, they measure the water temperature to see how many degrees it was raised, and thus

how many calories was applied to do it.

Now, even though you might be the bomb, you are definitely not a bomb calorimeter, and the way that food is burned inside of your amazing human body is radically different, and this should be obvious, it's radically different from the way that it's burned up in a container to heat some water. One of the major issues with this method is that the bomb calorimeter measures all of the available calories in the product, in the food product, but most typical foods also contain indigestible components like fiber, for example, that are generally not burned in the human digestive tract. This in itself can lead to inaccurate estimations of the calories in foods, and this is just a tiny, tiny factor of several more to come.

Now, with the tedious nature of using a calorimeter and the growing requirements of having caloric information labeled on foods, and this is thanks to the 1990... This is very recent, by the way, this is thanks to the 1990 Nutrition Labeling and Education Act, companies have largely switched over to a much easier method called the Atwater system to measure the calories on their products and put on the food labels. Atwater might sound a little bit familiar because this goes back to the homie Wilbur Atwater, so it's named after him. And food manufacturers are now able to simply do some math and come up with the calorie amounts to place on their labels. Noting... This is some basic stuff. Again, I was taught this in my traditional education, noting that each gram of protein contains four calories, each gram of carbohydrates contains four calories, each gram of fat contains nine calories, and apparently, nothing else matters, and so the calories on your food labels go a little something like this, taking that little bit of data into consideration.

Say you have a bottled smoothie and it contains 10 grams of protein, 25 grams of carbohydrates, and 7 grams of fat, so you take the protein, you got 10 grams times the four calories in each gram, so that's 40 calories, the carbs, you've got 25 grams times four, the four calories, that's 100 calories. So you got 40 calories from protein, 100 calories from carbs, and then you got the fat, you got 7 grams of fat in this particular bottled smoothie times and nine calories in each gram, so that seven times nine, you got 63 calories. And you take the 40 calories from the protein, the 100 calories from the carbs, the 63 from the fat, for a grand total of 203 calories that is going on that label on that bottled smoothie. The calorie labels on our foods are based on that and that alone. And putting our faith into these gross estimates has haunted so many dieters until now. Now, I want to give you a little heads up because there's actually a little bit of a... There's a nuance

thing here with the calorie counts that we use here in the US specifically, and we get into this conversation about straight-up caloric calculus, how it can get out of hand because calories on food labels are actually stated in kilocalories are kcals, that's what's actually what we're seeing on food labels here in the United States, they're not calories, it's kilocalories.

If a food label for a pint of vanilla ice cream say were really measured in calories, it would honestly inform you that there's about 600,000 calories contained in it, in one pint of ice cream. The number itself would cause someone to have a meltdown, most likely. And also, fortunately, kilocalories have been able to help simplify things a little bit, and for every one-kilocalorie measure, you can assume you're actually counting 1000 scientific calories, so I hope that makes sense. For every one kilocalorie, you've a thousand scientific calories. So instead of the ice cream being labeled 600,000 calories, it says 600 calories, and the Kilocalorie designation has just been dropped from the food label here in the United States specifically, without this labeling hack a typical meal could easily be over a million calories, which would lead us to drowning in long digit math all the time, and also having an even bigger calorie complex, in my opinion. So I just want to share that little bit of data, because the calories on food labels are not actually calories, those are kilocalories.

And they've just been kind of simplified and of drilled down to make it a little bit easier math for folks. So now when it comes to our worshipping of calories as the Pharaoh, as the monarch, as the kingpin of all nutritional measurement and data, we start to see that there's already some big gaps there in our understanding, and I want to take this a step further so that we can really understand the multitude of dimensions that influence our absorption of calories and how we also co-burn or expend calories. Now, right off the bat, most calorie counts are inaccurate because they're based on a system of averages that completely ignores the complexity of human digestion. One of the things that I've been talking about recently is the fact that each and every one of us has a unique metabolic fingerprint that's unlike any other person on the planet or in human history or whoever come after this, it is completely unique to you, and you alone and it's the ever-evolving metabolic fingerprint.

Now, understanding this simple thing alone, it's pretty cool that we're unique, but it can also be very confusing when we're talking about our interaction with food, specifically the measurement that we use in the form of calories. So I want to put some of these factors on display for us to really help to empower you in your

relationship with calories from this day forward. Now, the first thing to talk about that's covered in "Eat Smarter" is this concept of basic energy exchange. It's an agreed-upon reality that when you eat food, you are bringing in new calories, yes, but what's overlooked is the fact that you actually burn a significant amount of calories trying to extract the calories from the food you just ate. Digesting food costs energy, it costs your body calories to chew, it costs your body calories to swallow, to produce stomach acid and digestive enzymes to churn the food and to move it throughout your digestive tract, to mobilize the cells in your small intestine to kick in the gear and to snatch of nutrients from the food, to move the nutrients to their required places throughout your entire body and to ship out all of the metabolic waste products, just to name a few things that cost energy to extract that energy.

It's not as simple as what's on the label. There are also semi-obvious things that require caloric energy to be used, but the type of food you're eating itself will determine the net gain in calories you end up with more than just about anything. Again, some of these principles were taught to me in college, many of these have evolved over time after the traditional education, so I'm going to flesh them out as we go, but some of these points are going to be conventional wisdom, but we're going to just add on top of that. So it's generally accepted that protein takes the most energy to digest, this is well known, approximately, but for some folks not. They don't really understand how powerful this is.

Again, it's generally accepted that protein takes the most energy to digest, with approximately 20 to 30% of the total calories in the protein that you eat goes into digesting it. So 20% to 30% of the calories that you consume when you eat protein go into digesting that protein, while approximately 5 to 10% of the calories and carbohydrates are used to digest it. And the caloric energy used to digest fats are usually in the range of 0 to 3%. Again, it's vital for us to understand that it costs calories to absorb calories. It costs calories to absorb calories, and this is called the thermic effect of food. This is not accounted for in conventional conversations, this is not accounted for on the product labels.

Now, as a quick example, let's say you eat 100 calories of protein, your body will require 20 to 30 of those calories right off the bat, just to digest and absorb that protein, and in actuality, you're only receiving 70 to 80 of those calories. From the 100 calories that you consumed, proteins require as much as 10 to 20 times more energy to digest than fats do, because our enzymes in our bodies have to unravel these tightly wound strings of amino acids from which the proteins are



built. Yet again, food labels do not account for this energy expenditure, and on top of that, combinations of different foods, macronutrients, and fiber, all of these cost calories to process as well.

And also different combinations of foods consumed together, the macronutrients profiles, the macronutrient ratios, and also the fiber content of foods, these all cost calories to process all of these things and adds an added dimension, and these influence how much energy is actually required to digest the meal and what your net caloric profit actually is. So this is still taking a bird's-eye view of this calorie conversation, this is still some relatively well-known aspects of it that even though they're well known in science and "people who are in the know", the average person isn't getting access to this information and also being able to assimilate and use it in their own lives as they go on to these chronic calorie-restricted diets that people are getting on chronically over and over and over again.

And what the net result is as folks end up gaining more weight in the long term. As we talked about, meta-analysis, the biggest analysis of the results of diets for folks long-term, I found that one of the greatest predictors of whether or not you're going to gain weight later is if you go on a calorie-restricted diet. Do you understand? There's something missing. This calorie counting is not adding up, and it's not that it doesn't matter, it's not that the calorie is a viable tool for us to use, but there's so much more to the conversation that everybody deserves to have an education about so that we can help to finally change these things. And this leads us to another topic in the calorie conversation, which is the digestive strength and efficiency of the person.

Digestive enzymes in your mouth, stomach, and intestines are all required to break down complex food molecules into simple structures like amino acids, like fatty acids, that travel through the bloodstream to all of your tissues. Now, if your enzyme production is inefficient, whether you're making too many or too few, this will inherently influence how many nutrients and calories you're actually able to absorb from your food. For example, if you take two people who, one produces lactase, the enzyme that's needed to break down milk sugar, and one person who doesn't, and you give them each a bowl of ice cream, one of them will be able to extract more energy from it, while the other one is probably already in the bathroom, unsure if they have to fart or something more.

Hashtag: Better safe than sorry. And just because you're not digesting more of

the nutrients and calories in your food, this doesn't necessarily mean that it's a good thing. Weak digestive firepower can clearly disturb your health as well as the noses of people around you. We want to encourage strong, robust digestion, and another factor in this is our stomach acid production. Your stomach acid is critical in breaking your food down into more digestible components, plus it also aids in the absorption of things critical for your metabolism, like B12 and magnesium, though your stomach acid simply doesn't get respect when we're talking about conventional calorie discussions, your stomach acid plays a role in that, how many calories and nutrients are going to be able to absorb.

And it's a big player nonetheless, just like the type of food that you eat is a big player as well. And just a little sidebar, one of the epidemics we're seeing in our culture just skyrocketing rates of indigestion, of "heartburn", the inability to produce, or the overproduction. Oftentimes, it's the inability to produce that is then causing this kind of rebound effective indigestion. So a really devolved situation where folks are not producing adequate stomach acid, and this is another potential underlying player in why diets are so hard, and why diets are so difficult, is the inability to properly digest the food that we're eating, regardless of the calories that are on the package. And if our health leaders and experts and physicians aren't talking about these things in relationship to folks who are trying to lose weight, they're doing them a disservice.

Again, these are all things that we should be educated about. And we're going to dive a little bit deeper now, we're going to talk about how in the paradigm of calories being the king, the type of food itself matters in this conversation. It matters more than just about anything. Some foods, right off the bat, are simply more digestible than others, and some foods are more giving of their calories than others. Take this very recent study that's highlighted in my new book, *Eat Smarter*, and this was published in the journal *Food and Nutrition Research* that set out to find the difference in calories absorbed between a meal of "Whole Foods" versus a meal of processed foods that contain the exact same amount of calories. The researchers gave healthy test objects sandwiches of either multi-grain bread and cheddar cheese, deemed to be wholefood; or white bread and processed cheese product considered to be processed foods.

The results that they saw in this study were shocking. At the end of the study, they found that eating the processed food sandwich led to a 50% reduction in calorie burn after the meal was consumed, compared to eating the wholefood sandwich. The meals were practically the same in terms of proteins, carbs, fats,

and calories, they were all the same on paper, but the fact that the food was heavily processed or not, led to a dramatic difference in the number of calories that were stored and the number of calories that were burned. This isn't being accounted for, these are things that we have the right to know, people should know this, the type of food matters. And another thing to consider in this domain is that some foods are actually fighting you not to be digested when you eat them.

Let's use the plight of some blueberries, for example. Now it's important to understand that every living thing on Earth, the primary function, the primary programming is to extend on the life of their species, everything. It's a human's primary driving force, a zebra's primary driving force, and yes, even blueberries, okay? But spreading the seeds around. Zebras are going to go hump on some other zebras. Humans are going to hump on some other humans. All right? Shout out to Bobby Brown, Humpin' Around, okay? The hit single. And he had the leather outfit on in that video, by the way. But when we think about plants were like, well, that's not... Plants can't get up and run from us, but they're driven, the programming is there to continue on the life of their species by spreading their seeds around in a different way.

For the blueberry, one of the primary ways that they're able to extend on their seeds to create future generations of blueberries is by having animals like us eating them, and then the seeds play a little game of ride the roller coaster in our bodies and try to make it out the other end intact, and hopefully land in some soil, which if it's a natural setting, the poop itself is going to be some fertilizer. Biologist Rob Dunn states that "It's a kind of tug of war with the food that we eat." Now, sometimes calories from the foods that you consume are simply not digested, and again, this isn't taken into consideration. If we put them into the bomb calorimeter to give us that feedback of the calories and the food, it's not going to take this into consideration because some foods are fighting to not be digesting, they are simply not digested in the human gastrointestinal tract.

And yet again, this doesn't show up in that calorie equation. Another food and this is getting to something tangible and actionable, which is layered throughout Eat Smarter. Another food that tends to not abide by conventional calorie metrics are nuts. I'm not saying its nuts, I'm talking about nuts. And this is highlighted in a peer-reviewed study titled in short, Discrepancy Between the Atwater Factor Predicted. This study conducted by Janet A. Novotny and her colleagues at the US Department of Agriculture found that when the average person eats almonds,

they receive just 129 calories per serving rather than the 170 calories reported on the label. Calories may seem like a hard nut to crack, but every single piece of data that you're learning, you'll be able to use in your favor.

So we looked at the food itself, we looked at digestive efficiency, and we even looked at the basic energy exchange used to digest food in the first place. Now we're going to talk a little bit about how the food itself is prepared, how that affects calorie absorption and calorie availability. This is another thing that's not talked about. Now, understanding that some foods are simply already just more digestible than others, the way that foods are prepared can also make a substantial difference in how many calories are actually absorbed from these foods. Now, earlier in the book, I actually highlight some very critical data that many of the top researchers have affirmed over and over again, that the advent of fire and the advent of cooking our food was a major stride in the development of the human brain.

Just over time, our ability to take food and to cook it led to a rapid increase in absorption of nutrients and absorption of what we now label as calories and help to really evolve the human brain that we know today. So the power of cooking food unlocks a different potential in food itself, and that's what I want to talk a little bit about, because even within a single plant category, the durability of the cell walls of that plant and your ability to kind of crack into that cell wall and to get the calories from the plant can differ, depending on the age of the plant, how old the plant is, where the plant's grown and whether or not you cook it.

Let's take spinach, for example, older spinach leaves tend to have sturdier cell walls than the younger leaves, and generally speaking, the weaker the cell walls from the plants that we eat, the more calories we can actually extract from them. Now, if you cook the spinach, the cell walls that lock away the calories are easily broken into now, so you can get more from it, so the cooked spinach will inherently deliver your body far more calories than uncooked spinach, gram for gram. Again, this is not something that's discussed or thought about in most conventional calorie conversations, plus in the real world, whenever you cook the spinach, just think... I don't know if you have ever cooked spinach, you know this, you could take a whole jumbo box of spinach and cook it, and this entire massive jumbo box of spinach ends up being like a baby teaspoon of spinach at the end of it.

After you cook it all down. It's like this massive amount and then you got a little



teeny little Gerber baby spoon amount of spinach less than leftover. All right. So in the real world, if you think about this in that context, just the ability to eat more of it because now the density has been brought down. Cooking the spinach leads to number one increased ability to absorb calories from the spinach itself, and also the sheer volume that you can eat when it's cooked begins to go up.

So these are things to consider. It's not saying that raw spinach versus cooked spinach is more ideal, it's just having these things in mind when we are making our diet decisions, and probably we would need a little bit of both. So this is really profound what I'm about to share because this kind of dives in deep in this example that I'm giving. And this is from researchers at the Department of Human Evolutionary Biology at Harvard University, and they affirm that the process of cooking starch-rich foods and even meat substantially increases the caloric density that's gained when you eat those foods.

So now you know whether it's baking it, microwaving it, flame grilling it, boiling it, broiling it, flambéing it, when you cook your food, it brings out a change in its structure, a change in its chemistry, and a change in its caloric availability that goes un-discussed oftentimes in the calorie conversations. And this is just, we're still scratching the surface. We've taken this term, this calorie, and we've made it the governing force over so many things when in reality, there are so many things that determine the governing force of the calorie itself. And one of those and one of the most fascinating and such a cool aspect, and I layer throughout each smarter multiple times, conversations about this and tools to utilize this for our benefit when we're talking about metabolism, and we're talking about just overall health and wellness, reducing inflammation. The list goes on and on, is how calories are influenced by the make-up of your microbiome.

A fascinating recent study published in the peer-reviewed journal Cell, revealed that the presence of a specific type of gut bacteria in mice actually block their intestines from absorbing as many calories from the food that they ate. It blocked their intestines from absorbing as many calories. Now you couple that with recent human studies, including data that was conducted by researchers at Wiseman Institute of Science, confirm that there are a specific gut bacteria that are more prevalent in people who are overweight or obese. And the big kicker is that by transplanting these human "fat bacteria" into healthy mice caused the mice to gain weight, have increased blood sugar, and have higher levels of body fat. Simply by changing their gut bacteria. Now, we know that the microbiome has a massive impact on our health overall, and just really the final frontier in this

discussion, but the connection to our metabolism has not been highlighted enough.

And that was something I was very passionate about making sure was in the pages of Eat Smarter, including a recent study published in the International Journal of Obesity, and it revealed that a higher diversity of gut bacteria is directly correlated with less weight gain and improved energy metabolism independent of calorie intake. The diversity of our gut bacteria as a major role in determining our body fat percentage, energy metabolism, weight gain, weight loss, independent of calorie intake. This is profound, and this is yet another example of how two people, same height, same weight, can consume the same amount of calories, while one person continues to gain fat and one person is able to lose weight on the same diet. And we battle with ourselves, we think that we're doing it wrong when our friend or our family members on this particular diet, and we're following it to the T and just wondering what's wrong with me.

Maybe there's something wrong with the system, maybe there's something wrong with what we've been taught, and the diversity of our microbiome appears to play a major role in how many calories we're extracting from our food. And so if our microbiome is in disarray, if we have dysbiosis, if things are not in balance, these are all implicating today, now we know more than ever that regardless of the types of foods that we eat, the diets that we're on, the calories that we're counting if our microbiome is not healthy, we will not be healthy. And it's also noted that certain bacteria are much more apt to absorb more specifically from carbohydrates and sugar calories in our foods than from other macronutrients. A certain bacteria that are prevalent in our culture, these "fat bacteria", they love, they love and sugar. Love it!

They love it, they make sure that more of that, those types of foods are getting just like I gave you the example, with the wholefood sandwich versus the processed food sandwich. They're taking that energy up and they're also less apt to let that energy go as well. It's estimated that every one of us has about two pounds of microbes that are living in our gut. Now, this isn't something to be freaked out about, this is a symbiotic relationship. It's supposed to be a symbiotic relationship, but we also have opportunistic bacteria and viruses and all the things we've been talking about on the show for many years, but it's understanding that this symbiotic relationship is beautiful when things are in balanced, but when things get out of balance, all bets can be off.



Now, just to recap, there are obviously so many factors that go into how our body associates with the calories we consume, but also how we expend those calories. And right now, I want to dig in and look at some of those specific components so that we can be more empowered in this and understand that there is truly a much bigger story. The complexity of the human body and human metabolism is wonderful, but it can be very complex, but there are very simple principles that govern the complexity that we all can pay more attention to and abide by and if our conventional understanding of these things, conventional medicine, conventional systems of nutrition are not teaching these things, we're going to make sure that everybody is able to get the right education. We're going to make sure that everybody is able to get access to these real paradigm-shifting tools and tactics and insights so we can start to cultivate more health and wellness within our own bodies, our families, and our communities. Now saying that there are many factors that determine the rate at which your body absorbs calories, and the rate at which your body is willing to release those calories.

To say that there are many factors, I'm talking many. But I want to highlight one of them. They might seem really surprising. And this is from research published recently in the Annals of Internal Medicine, and this is one of the big kahunas of peer-review medical journals. Now, they established that your sleep, your sleep quality has a major impact on what your metabolism is doing and the energy expenditure of your calories. What they did was they took test subjects and they put them in... The beautiful part about this is that this is a ward study, this is an inpatient ward study. So they're providing their food, they're monitoring everything, this isn't just made up, it isn't like, "Here take this goal, tell me a report later." This is giving us some very factual data. So this was taking two groups of overweight individuals and put them on a calorie-restricted diet. Calorie restricted diet, calorie-restricted diet for 14 days. One group clocked eight and a half hours of sleep per night, while the other group was sleep-deprived. They sleep-deprived them, only allowed them to get five and a half hours per night. So we got eight and a half hours per night for one group, five and a half hours per night in the other group. Again, both groups ate roughly 1450 calories a day. Both groups' food monitored, same diet.

After two weeks, the people who slept more lost significantly more body fat than the group who slept less to the magnitude of 55%, more body fat lost. Now, more than half of the weight lost from the extra sleep group was from their body fat versus the folks who, by the way, they did lose weight, they just didn't lose as much fat. The folks who were in the sleep-deprived group, only about a quarter

of their weight loss came from actual body fat. Now, this is what's more startling here because where did their weight loss come from if they're still losing weight. The folks who slept less lost about 60% more of their muscle from their weight loss, from that calorie-restricted diet. Please get this. When they're sleep-deprived, their body was burning their muscle. Those three hours of sleep loss caused a shift in their metabolism that made their body want to preserve fat at the expense of their muscle. Now, where your body is actually taking the calories from in your tissues has a massive impact in your overall rate of calorie burn long-term.

We know that muscle is metabolically expensive to carry. You're going to have a higher basal metabolic rate. You're going to be burning more calories, just by the nature of you having more muscle in your frame. Now you're dieting and losing that muscle, what happens to your rate of calorie burn in the mid to long-term? Oh, I hope you're getting this, I really hope you're getting this, 'cause this is part of the problem, when they're putting and promoting continuously for decades now. Folks on these calorie restricted diets without paying attention to how much your sleep influences how your body burns calories. The calories that your body is burning, 'cause we think in terms of burning calories when we're exercising. We got the Fitbit, we got the Whoop, we got the different monitors to tell us how many calories we're burning. We even thinking in terms of how many calories we're expending during exercise. Where is that burn coming from? Where is that calorie expenditure coming from?

Because if it's coming from your muscle, we've got to do something about this. So this is yet another dynamic of the calorie conversation. And also, of course, in Eat Smarter, we address how food has a massive impact on our sleep quality and key nutrients, and some of the latest cutting edge research, it's just amazing, absolutely amazing. But most importantly, people need to have access to this kind of data. There's a virility to books and having this book out on book stores and department stores across the country, and being able to see this every day, folks, it matters, guys, it matters. We can change this thing, we've got to make sure that we're getting educated and make sure that we get books like this in the hands of more people and on more bookstore shelves and just in a place of prominence to really give people the truth when so much of the data out there has been whittled down to these cookie-cutter diet formats telling people eat this, not that without giving them the real behind the scenes story. How does your metabolism actually work?

I understand with managing counting calories, hundreds of millions of people have done that and failed. This is not because they're bad people, this is not because they're not smart. It's because the system is flawed. And it hasn't given people the real education about how it works. On the premise that people are smart enough to know if you listen to the experts if you listen to the powers that be who are in controlling the data I know we are. It's just taking the complexity out of it and making it make sense for people. And we can change this thing. So sleep is obviously a very interesting and dynamic factor when we're talking about our rate of calorie absorption and expenditure, but also I've mentioned the type of food that we eat. For example, and I gave you the study with almonds, that was pretty remarkable, like 50 of those calories are not being accounted for that you got 50 more calories on the label than what your body is actually absorbing. But this is specific to foods like almonds, but there are some other interesting foods that have some impact on calories as well. Specifically, this is a study cited in the European Journal of Clinical Nutrition. And it asserted that the inclusion of as little as 15 grams of medium-chain fatty acids per day was enough to boost study participants rate of calorie burn by 5%.

It boosted their rate of calorie burn by 5%. That's substantial simply by including more medium-chain triglycerides. So shifting the ratio, it's not just about the calories. What's the ratio of where the calories are coming from? What types of fats are in our ratio or macronutrient ratio? Is it PUFAs? The polyunsaturated fatty acids that have become so dominant in our food today, these oftentimes very rancid oxidized processed seed oils, then still slap vegetable oil on the label. Is it that stuff? That was only 2%-4% of human body fat tissue around the 1900s when you take biopsies and today now it's upwards of 30% of human body fat tissue. We've changed the ingredients that make up our fat tissue. What if we shift the ratio and add in more medium-chain triglycerides? Also in that context, understand that these medium-chain triglycerides, where are we getting these in our diets today? It's not in the conversation or is it something that's easily accessible. And if we're talking about the different types, the chain of the medium-chain triglycerides, the caprylic acid etcetera. It gets its name from a word derive meaning basically female goat. We're talking about caprylic acid.

And this is one of the viable sources in nature, is milk, mother's milk, goat's milk. It has more medium-chain triglycerides than does cow's milk, but that has it as well, so dairy products, but also coconut products as well. That's what I use. I have it every day, medium-chain triglycerides, the MCT oil from Onnit. And I love it because they have the emulsified version as well, that has this thick coffee



creamer, that's great to add to your teas and coffees, hot beverages but also you can add to smoothies and things like that. And it tastes so good, by the way. I love the almond milk latte flavor, and this is something that's just a part of my daily routine. So it literally changes the way your body is burning fuel. Remarkable. So by the way, onnit.com/model, it's O-N-N-I-T.com/model. You get 10% off their MCT oils. They also have the original MCT oil, they have the emulsified versions and just a bunch of cool stuff over there, and they use only earth grow nutrients. They do a lot of peer-reviewed trial, invest... Man, it's so expensive to do a real clinical trial and they do that for so many of their products as well. So pop over there and check them out on onnit.com/model.

And another misunderstood and even controversial nutrient, that's involved in your rate of calorie burn is caffeine. The study cited in the American Journal of Clinical Nutrition found that caffeine can increase your metabolic rate by 3% to 11%. And listen to this, most of the increase was found to be directly from an increased burning in stored body fat. Again, caffeine is something that has some controversy surrounding it, but it's been utilized literally for thousands of years by cultures all over the world in various sources. There's caffeine found in coffee, there's caffeine round in various types of tea and chocolate and the like. But the interesting thing about caffeine is that it triggers the release of catecholamine in our bodies. So things like adrenaline, for example, that sparks the release of stored body fat to be used as fuel. Now, this is a temporary increase in this metabolic rate, of course. And what's found is that there's a U-shaped curve in benefit, so a little bit of caffeine from these various sources each day can be helpful. But you don't want to go so far just like utilizing all of these pre-workouts and all these different types of caffeine, where you can actually start to burn out these catecholamine-producing organs, your adrenals, for example.

We don't want to push the gas pedal down too far. But a little bit is great, especially if it's coming in viable natural sources. And the most common source today would probably be coffee, which is one of the most commonly traded commodities in recent history. And you also have to know that there's a wide variety of different types of coffee. And the type of coffee and the quality of that coffee is of the utmost importance, you don't want coffee that's been sprayed with pesticides and herbicides and rodenticides, the suffix cide, at the end of those words means to kill.

These are compounds, these are synthetic chemicals designed to kill small microscopic organisms. And what is your body mostly made of? Small



microscopic organism. So getting organic coffee, of course, is important. And of course, at this point, you should know that I love a coffee blend that's melded with medicinal mushrooms because of the acidity of the coffee, it's really balanced very nicely with the alkalinity that's found in medicinal mushrooms like Chaga, and cordyceps. And so for myself personally, what I have each day is the coffee blends from Four Sigmatic. And one of the big reasons is, of course, they're using organic high-quality coffee, simple, very easy to use, and then it's blended with, today, I had the lion's mane in there as well. And the University of Malaya found that lion's mane has been clinically proven to support neurogenesis. So it's a creation of new brain cells, and it's found to be neuro-protective overall. That's one of the big issues that folks are struggling with today is this neuro-inflammation, and we have nutrient sources that have been used for centuries that help with these things.

And so you get this along with your high-quality coffee and this boost in metabolic rate, it's just a win-win. And that's foursigmatic.com/model as well, and you get 10% to upwards of 15% and even 20%, depending on which products you're getting and how much you're getting, you're going to get a variation in your discount. But they're definitely going to hook you up so highly recommend check them out foursigmatic.com/model, that's F-O-U-R-S-I-G M-A-T-I-C.com/model.

But also another factor in the equation of calorie burn can be found in something so simple, so connected to our livelihood, and it's often overlooked. And this is highlighted in a study published in The Journal of Clinical Endocrinology and Metabolism, found that drinking water can increase your metabolic rate, through a process called Water-induced Thermogenesis. The research has discovered that drinking about 17 ounces of water within a couple of minutes can temporarily boost your metabolic rate, can temporary boost the amount of calories that you're burning by about 30%. The increase was found to occur within 10 minutes and reach a maximum after 30 to 40 minutes. The total thermogenic calorie burn is around 25 calories.

So doing this three to four times a day can help folks burn an additional 75 to 100 calories. Who's telling you this? Drinking something without calories makes you burn more calories. Come on. Now, to be very clear, this is really a summing up the paradigm of why it's important to drink water when you're working on your nutrition and getting healthier, those kinds of things. These are some of the underlying things that people... We're hear to do it, but why? What if they find



out that they get this kind of benefit from it? But of course, there's a balance there. We don't people to go water crazy, but most people are chronically dehydrated. So having more legs under their belief of why this water matters can be a game-changer for folks. And part of the reason that this does this, it's not just because water is just, oh, it just makes you burn calories, it's because your body is trying to warm the water up or whatever, it's because when you drink water, the very basis of your metabolism is built on water.

Maintenance of your DNA. Water is responsible for maintenance of your DNA. It's the container which is operating. It's facilitating the reactions of your mitochondria where fat is burned, also maintaining the integrity of your blood. The transfer of nutrients and oxygen throughout your system, your immune cells, waste removal, creating your lymph fluid to help to address and modulate your immune system, which by the way, your immune system is another factor in your rate of calorie burn, by the way, your immune response to the food that you eat, that's not on the goldfish crackers. It doesn't tell you that. Also, water is included, or should I say, the most dominant factor in maintaining our fluids in our system so the fluids of the digestive tract, synovial fluid, digestive secretions. I just like saying secretions, by the way.

Regulating your body temperature, the synovial fluid, your joints in between your intervertebral disc, these are non-vascular disc, but they're able to absorb water through a process of remote diffusion. Your spine, your disc in your back are one of the last places to get water because it doesn't directly go there. You need a really super hydrate system so that your body can do the practice of actually getting water where it needs to go to all the tissues that need it. So again, these are things that are not part of the conversation. This is highlighted, and what I just shared with you is all data from Eat Smarter. And if you have not pre-ordered your copy, do so right now. Pause this, pre-order Eat Smarter. Go to eatsmarterbook.com, and right now immediately, when you pre-order Eat Smarter, you're getting instant access to a brand new video course that I put together, a mini-course highlighting 10 of the most effective foods for helping to optimize your fat loss related to hormones.

There are certain foods and nutrients that regulate the hormones involved in you gaining fat and burning fat. These are things that we need to know. It's above. It's an Epi force, epigenetic force above calorie control that we can do something about. So eatsmarterbook.com. Head over there, if you have not done so already. This is a movement. If you're listening to the Model Health Show, this is my want



to ask, is for you to pre-order *Eat Smarter*, get a copy, maybe get a couple of copies for the people you care about, and really help to usher in this movement. This book is going to be everywhere, and it's up to us how much of the conversation we can help to shift towards real health and wellness. So it means a lot to me, if you've gotten any value from the Model Health Show, please go to eatsmarterbook.com and pre-order a copy today. And by the way, international, we're going to be coming soon with the publisher its different dynamics. So here in the US, Canada, head over there, ASAP, we've got many other countries coming as well. We got a Japanese translation coming very soon. But just stay tuned, head over to eatsmarterbook.com pre-order today.

And I want to share a couple more really poignant insights with you. Another factor that is often not considered here in the calorie equation is the fact that we've already talked about the microbiome, but the gut brain axis is one of the leading things that's being uncovered today, and the science is just fascinating. And one of the big underlying issues in regulating your body's caloric burn is not paying attention to the organs involved. So the governing force is your hypothalamus. It's known as the real master regulator of your endocrine system in your brain. So your brain is largely determining whether or not you're absorbing calories, how many calories you're burning. But we don't talk about this. We don't talk about this. And this is highlighted in a study that was published in the *Annals of New York Academy of Sciences* and highlighted in *Eat Smarter* as well, and it reported that hypothalamic inflammation is a double-edged sword in nutritional diseases. The study authors reported that systemic inflammation from things like metabolic dysfunction and excess body fat led to brain inflammation. And brain inflammation itself leads to metabolic dysfunction and excess fat.

So the rate at which you burn calories, your metabolic function when you have inflammation in your brain. Listen, what diet programs are talking about helping to eliminate or helping to decrease the level of inflammation in your brain to help you to lose weight? I gather that a lot, pretty much none are doing that, none of them are talking about these underlying issues, and these are things that we can do something about. And so there's a lot highlighted within the pages of *Eat Smarter*. Really big dedication to the science behind inflammation, information of our calorie regulating and fat regulating organs, so your thyroid, liver, etcetera, and the breakdown between the thyroid and your brain.

And I want to share one more, and this was coupling with the data that's



published in the journal, Clinics in Gastroenterology, along with friend and multi-time guest on the Model Health Show, New York Times best-selling author, Dr. Alan Christianson shared with me that inflammation in the liver can have a huge impact on our thyroid function. Your thyroid is really noted to be the master regulator of your metabolism. Overall, the hypothalamus is the master regulator of your endocrine organs, the thyroid is largely responsible for regulating your metabolism. And your liver is critical to transport metabolism stored in excretion of your thyroid hormones than many other hormones as well, by the way. And he stated that "If your liver does not manage the thyroid hormones properly, it can slow your metabolism by hundreds of calories a day."

Please, I really want everybody to get this today. This calorie paradigm is not enough. It's understanding how our organs are incredible, dynamic organ systems, and tissues, and cells, how all of this together is regulating our rate of energy expenditure. It's regulating our ability to absorb calories and to use calories. There are levels above there are Epi influences above caloric control that are determining the energy used within our bodies. And these are all things that we can serve. These are all things that we can help and uplift and support. But when we hear about non-alcoholic fatty liver disease caused by diet, for example, we're not giving solutions on how do we fix it, how do we ensure that our amazing liver liv-er, largely responsible for making sure we stay alive, how to actually keep it healthy when it's responsible for so much. And these are all within the pages. So I hope that today really helped to layer and highlight many pieces of the equation that are not talked about. And I want to cause and support a shift in public consciousness in how we relate to our bodies and our metabolism, and also how we relate to each other, which is another big part of the book. But some other just general principles I want you to think about and keep in your mental Rolodex in relationship to our conversation about calories.

Because guess what? Just a basic thing that we should know about. Men and women tend to absorb and burn calories differently. But there isn't like a men's panel on the package and a women's panel. But this would be like you would probably, "Oh yeah, our hormones are very different. The ways that our bodies are designed and functions are very different. There's different brain activity, because my brain is determining what our bodies are doing with the calories you consume." The list goes on and on and on. We're going to expand this conversation, because this is what needs to be done right now. What we've done has not worked prior to this. And now we actually understand the things that are really regulating things behind the scenes. So that's one piece. Also moving on



and keeping this in your mental Rolodex, you know some other things that affect your rate of calorie absorption and calorie burn, your age. Have you thought about maybe you're in your 40s, and when you were 16, got that license, you'd pull up to the sonic, the local sonic, the sock hop. There wasn't a sock hop back then. Maybe if you're in your 70s right now. But back in the day, you could eat whatever you want. That's what people say, "I can eat whatever I wanted. Wouldn't gain an ounce."

Now, if the bakery down the street, if the wind blows wrong, you fill your butt bigger. You catch that whiff, you catch that bagel whiff and you go get on the scale, you're like, "What the... I just whiffed the bagel. I didn't even eat it." What changed? Your metabolism changed, your hormones changed. The calories are the same, but what changed is our metabolic fingerprint, your age, your ethnicity has an influence on metabolism. Who's talking about that? Your current weight. Your weight influences what your body is doing with the calories that you're consuming. And I spend a beautiful portion of the book talking about the various types of body fat and how they work. People need to know this stuff. Speaking of which, your percentage of brown adipose tissue that you have on your body affects your rate of calorie burn. Your body fat percentage affects your rate of calorie burn.

The response of your immune system to different foods affects your rate of calorie burn. Your levels of inflammation, as mentioned, affects your rate of calorie burn. And the most beautiful part is there are solutions to these things, all backed by peer-reviewed evidence, and this is what's highlighted the nutrition strategies to address these underlying issues in Eat Smarter based on science and not superstition. So again, make sure to head over now and pre-order Eat Smarter. Get access to the special bonus. I don't know how long we're going to keep this bonus available. It's a 10 video mini-course for free. \$97 course that you get for free. So pop over there right now, eatsmarterbook.com and help to usher in and be a part of this movement.

I appreciate you so much for tuning into the show today. I hope you got a lot of value out of this. And listen, we've got some epic, epic shows coming your way very soon. So make sure to stay tuned. I appreciate you immensely. Take care. Have an amazing day, and I'll talk with you soon.

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