

How to Boost Your Metabolism & Burn Fat

Perform with Dr. Andy Galpin · Episode 11 · February 5, 2025 · Transcript

This transcript was generated using speech recognition software and may contain errors. Please review the episode audio before quoting from it.

Dr. Andy Galpin

The science and practice of enhancing human performance for sport, play, and life. Welcome to Perform. I'm Dr. Andy Galpin. I'm a professor, scientist, and the executive director of the Human Performance Center at Parker University. Today's episode, we're going to be talking all about how to boost your metabolism. The reason I chose this is because of all the topics in the entire space of human performance, this probably has the most discussion among pop culture. You see it everywhere. Supplements, diets, magazine covers, boosting metabolism. You speed up your metabolism, is one of the most popular topics yet, because of that, it's also fraught with misinformation, with outright lies. And so how do you understand what's going on? In preparing for this show, I asked a lot of my friends, many of which have PhDs in the field, master's degrees, registered dietitians. I just simply asked them, "Can you speed up your metabolism?"

Dr. Andy Galpin

And I never got a straight answer. Nobody I talked to confidently was able to tell me, "Yes, you can," or "No, you can't." And so I was really excited to do this topic and break that down for everyone, because the reality of it is we have a lot of science here. There are some extremely clear-cut answers about whether or not you can even have a fast or slow metabolism. The reality is you can't. Your metabolic rate and my metabolic rate are not necessarily different. But despite that, there's over a dozen different scientifically documented ways in which you can enhance your metabolism. We have learned very recently, a lot of information about what explains why some people can do things like eat more calories, eat more food, but yet not gain as much weight as you. That is a real phenomenon. Even when all other variables are controlled for, that can happen. But that's not explained by having a faster or slower metabolism.

Dr. Andy Galpin

And so these topics and many more are what I'm going to get into in today's show, and I know that when you leave the episode, you will know much more about how metabolism works, what it really is, and exactly what to do to enhance it if you so please or so would like to do that, and what the true state of the literature says on enhancing, boosting, or speeding up your metabolism. As always, we're going to tackle this problem by covering the three I's, investigate, interpret, and intervene. So by investigate, we'll walk through really quickly how to get this tested or measured. If you're interested in learning more about this, what are some of the high-end

ways, the most scientifically supported, all the way down to low or moderately low cost, and all the way down to free, if we can. From there, I will talk about how to interpret those data. So how do you know whether you're slow or fast or high or low, or where it should be based on your age and sex and other factors that are important.

Dr. Andy Galpin

But we're going to spend most of our time on the third I, which is I will cover what we know scientifically about what works and what doesn't work. We'll get into exactly how much it works. So what's the magnitude of effect? How much will it raise my metabolism by, and for how long? After that, we'll talk about the specific details of the protocols, if you will. So what to take, how long, what dosage, what timing, and so on and so forth, in the case of, say, supplements or food. We'll talk about other factors, including, but not limited to things like the temperature, water intake, spicy foods, types of exercise, sleep protocols, and so forth. The reality of it is, we have a lot of different options from the lifestyle, from environmental, from food and supplementation, that give you the ability, potentially, to increase your metabolic rate. We're going to finish the episode by going over what I call a couple of case studies, in which I give some sample combinations of these factors that I have used and do use in the folks I work with to effectively enhance metabolic speed in a long-term, successful, adherent fashion.

Dr. Andy Galpin

So things that are going to be not just giving us a short bump, a short-term effect, but something that is long-lasting and sustainable over time. So to get us started, the first thing we have to talk about is what we're even talking about. These terms, as I open up the show with, are maligned. They're confusing, and that's in large part, and often is the case, just because of simple miscommunication. I'm going to keep it brief. I know in the past, and I love to talk at length about the physiology and what's happening at the cellular level. Not going to do much of that today. But I do need to explain the different parts, because as you'll see the episode unfold, we're going to talk about how each intervention or protocol or thing that you can do influences each area of metabolism. And it's really important that you do something that covers all four of the major areas so that you have the most likelihood of improvement.

Dr. Andy Galpin

So we have to know what those areas are, and then roughly what they mean. I promise, though, I will keep it very brief, and by that I mean it's Galpin style, but it will still be brief for me. Now, some of you might be thinking here, I'm not incredibly interested in fat loss or metabolism. Maybe you're already lean and you're lean no matter what, or you don't work in the area or with clients who care that much about fat loss. So you might be thinking to yourself, "This episode isn't for me. I'm just going to tune out." I'm going to try to caution you against that for a couple of reasons. One, you're going to care about your long-term metabolic health, and this is highly tied

to that. And so just because the fact that you're lean now doesn't mean you always will be lean. In addition, if you do want to continue to stay lean, you need to keep this engine revved up as high as possible for as long as possible.

Dr. Andy Galpin

And so we're going to cover exactly how to do that from what we know scientifically in today's discussion. The second thing is what I call the higher delta. So let's imagine a scenario in which you consume and burn exactly 2,000 calories per day. So you're net equal. And at that, you keep the exact same level of muscle and energy and recovery and performance and body fat and so on and so forth. If I could do that exact same thing at 4,000 calories, now I've got much more options. What I mean by that is if I can keep you at the exact same for all those variables at double the caloric load, I've got a greater ability to increase my food intake, which means my micronutrients go up. If I eat double the food, I get double the vitamins and minerals and nutrients and fiber intake. And if I'm staying at the exact same body composition, body mass, that is a huge advantage. Additionally, it now becomes far easier to lose weight if you ever want to do that.

Dr. Andy Galpin

One of the things that makes it really hard for weight loss, if your metabolism is, quote-unquote, "slow," again, think that total input versus output is low, say 2,000, and you want to drop it by, say, 500 calories, you've reduced a significant portion of your caloric intake. You're going to feel that, and you've dropped a quarter of your calories. However, if you're at 4,000 calories turn and burn, and we drop you by 500, now we've only lowered your intake by a small percentage, and so you don't feel that much of a difference. You won't really feel 3,500 calories versus 4,000 calories, but you'll feel 15 versus 2,000, even though in both cases it's exactly 500 calories. And so for a lot of people, there is still a huge interest in understanding and making your overall metabolism function how you want for both the short and long term, regardless of whether or not body composition or body fat is your primary, secondary, or even of slight interest to you right now.

Dr. Andy Galpin

Now, I could continue talking about that delta and why you want to avoid energy toxicity, but you do at the same time want to have a high caloric intake, but we'll save those thoughts for another conversation. We want to get really into today's topic, and so what does speeding up your metabolism even mean? And I've been using a bunch of different terms thus far on purpose. I've tried to throw out misconceptions. I've used the wrong phrase intentionally because that's how it's used colloquially. That's probably how you've heard it, and that's how you've thought about it. So I've done that with direct intent there. We're going to talk about what those things mean. We're going to talk about what it actually means to have a fast or slow metabolism, and so let's

get into those very basic parts right now. Scientifically, metabolism is the net of all cellular processes in your entire body. So when you're metabolizing hormones or proteins or energy substrates like carbohydrates and fat, all of that is combined together to make up your metabolism.

Dr. Andy Galpin

So that is a giant net. It is not specifically and only referring to the calories in versus calories out, what you're burning for exercise, or your body fat composition. It is all things going on. That is an incredibly difficult number to come up with. It is not a rate. It is a total amount. What I mean by that is it's not a speed. This is why I can tell you, people in our field, and mind you, I've got a PhD in human bioenergetics, so people in this field will tell you there is no speed component here. It is a total rate component. And so the analogy I'll give you here is a car, okay? Now, if I had you driving in your car at 50 miles an hour and we increased you to 70 miles per hour, your speed went up. Okay? When people think about boosting their metabolism, that's what they think happens. I'm driving faster. And when we say you don't speed up your metabolism, when I tell you yours is the same speed as mine, what I mean is we're all driving at 50 miles per hour.

Dr. Andy Galpin

But at the same time, I also did tell you we can raise it, and that there are some people who can handle more energy and not gain as much and so forth. That's not a speed issue. What that is is the total amount of drive time, right? It is not speeding up your metabolism. It is going through metabolism more frequently. That's effectively what's happening. So it's driving more often. If you drive more often, let's say again, the analogy of speed here, we're both driving at 50 miles per hour. You don't speed up or slow down, but I drive for one mile and you drive for 15. Who burned more gas? You did. That's exactly what we're talking about. So somebody with a fast metabolism is someone who's simply driving for 15 miles, and someone with a slow metabolism is somebody who's driving for five miles or two miles or whatever the case may be. That is incredibly important because as we start getting into claims in the field and misconceptions and improper marketing, they're going to use those things as tricks and ways to twist you.

Dr. Andy Galpin

So easy examples, there's plenty of supplements that you can take that will, quote-unquote, "speed up your metabolism." They will turn it on. They will get you going. But they do not result in any additional fat loss for mechanisms in which we will cover later. And so understanding the very basic principle there lets you realize, okay, great, they can make a certain claim there, but in reality what it is, what I'm trying to hear is that product will help me lose fat more, and that will not be the case. That is often what we see and have historically heard in the magazines, in the media, with the supplement companies and so forth regarding speeding up your metabolism. So now that you understand that, you're not going to fall prey to that trick again. So here's what we

really mean. When people say, "I want a faster metabolism," or, "My metabolism is slow," and so they say, "My metabolism is too slow," or, "I want it to go faster," what are they really saying?

Dr. Andy Galpin

They're generally talking about body composition. I hate to phrase it this way. I didn't want to do it because there's so much more to metabolism than just body comp, but again, this is a very easy entry point for us, so we'll stay here just so most people can understand. So when they're saying that my metabolism is slow, what they're usually saying is a comment about their body composition. They have more fat than they would like. It's hard for them to lose fat. It's hard for them to gain muscle. Or the opposite, someone who complains of a fast metabolism is somebody who's having a hard time gaining muscle. "I eat, and I eat, and I eat, and I just can't gain. I eat and I eat, and I just can't gain." So there's complaints on both sides of the equation. Example here, just to give you some math, let's say both you and your friend eat 1,500 calories a day, and let's say we live in a magical universe, and stress and sleep and all that is all equated for.

Dr. Andy Galpin

The only difference between you, you both had 1,500 calories per day for eight weeks. One of you loses three pounds, the other loses 12 pounds. That is a real thing. That can and does happen. It's easy then for you to think, "Okay, metabolism fast, metabolism slow." So what's really happening there is a change in what we call TDEE, or total daily energy expenditure. When you hear the phrase fast and slow metabolism or the phrases, I want you to think total daily energy expenditure. Now, that has four unique components, and I'll cover it in one second. But the reality of it is what could be explaining that person who lost more weight than you did or didn't gain as much, whether you're in a caloric surplus or caloric deficit, it doesn't matter, something in that total daily energy expenditure was different for them. There is no thing in that component that is metabolic speed, but that's the translation.

Dr. Andy Galpin

All right? So boosting metabolism is really an increase or decrease in total daily energy expenditure. If you want to look at total body mass, body composition, we can look at this as simply as our energy expenditure versus our energy intake. A lot of times you'll see this abbreviated as EI, energy intake. So I can increase or decrease my weight by changing either side of my equation. For example, if I increased my total daily energy expenditure, of which I have four ways to do that, four components, but if I increase that and I didn't increase my intake, my body mass will go down. Or I could keep my energy expenditure the same, and I could lower my energy intake. Okay. Or combinations of both. But that's honestly what we're talking about when we're discussing metabolic speed. I'm actually fine with people saying, "I've sped up my metabolism," as long as we're using it appropriately in this context.

Dr. Andy Galpin

I don't like to use it, but I absolutely get it why most folks do. And so total daily energy expenditure, as I said, has four components. What are those four components? The first one is what we call EAT, E-A-T. Some people call this EE. What we're effectively talking about is exercise. So EAT stands for the exercise activity thermogenesis. It's the calories you burn during exercise. EE is energy expenditure. It doesn't matter how you think about this, but it's how many calories did you burn in your workout? For most people, that's going to represent somewhere between zero to 30% of their total daily energy expenditure. So just to make sure you're following me, of all the calories you burn throughout the day, everything combined, if you don't work out, well then none of your caloric expenditure is going to be explained by exercise. Most people, though, are probably going to have 10% to 20% of the calories they burn throughout the day coming from exercise.

Dr. Andy Galpin

Folks that are really training a lot, maybe closer to 20, 25, or even up to 30%. It's hard to get past 30%. You would have to train a ton. But you can generally think 10, 20% of your energy throughout the day coming from calories. We will talk about this later, but this is one of the reasons why, and I will explain very clearly why this is the wrong thing to think, but this is the fodder some people use to say things like, "Oh, exercise doesn't even help with fat loss." And they're not entirely wrong here because it's not explaining the largest part of your caloric expenditure. 10%, even for someone who works out pretty often or pretty hard, 90% of the calories you're burning are from things not exercise. So they're not completely unfounded, though, again, I think it's really terrible advice. We'll talk about that and the research on it in detail later. But again, component number one of total daily energy expenditure is exercise.

Dr. Andy Galpin

Component number two is similar to EAT, which is called NEAT. So it's EAT with an N in front of it. It is non-exercise activity thermogenesis. This is all the other physical activity you're doing throughout the day that is not structured and specific exercise. This is everything from fidgeting to walking, pacing, taking the stairs, going parking further in the parking lot so you walk more. It is all of those other things that are still going to expend calories, but they're not exercise.

Dr. Andy Galpin

One of the interesting things about this is this has oftentimes as much, if not a bigger component of your total energy expenditure than structured exercise does. People have completely forgotten about this, but the reality of it is it's going to be somewhere between 5% to 30% of your TDEE. The next two components are what's called your TEF, and I apologize for all the acronyms here. I'm trying to really make sure we walk you through it, and I think you're holding on this far. It is the thermal effect of food. This is quite simply the energies or the heat you create

in response to breaking down food in your stomach. So the reality is when you eat food items, they sit in your stomach. You have to burn some calories to digest them, if you want to think about it that way. And that then creates some caloric expenditure. It's usually about 8% to 15% of your TDEE. And so if you add EAT, NEAT, and TEF up, what you have remaining of that 100% is your resting metabolic rate, and that ranges from about 40% of TDEE all the way up to 80%, especially in folks that are sedentary or lowly active.

Dr. Andy Galpin

So as we get into this, how I'm going to cover the intervention and the research is which area of total daily energy expenditure is each given protocol or intervention influencing? So what can we do to increase our EAT? What can we do to increase NEAT, TEF, as well as resting metabolic rate? The reality, as I said at the beginning, I think it's best that you try to implement a well-rounded plan that influences all four of these components, or at least multiple of them. But if you can't exercise, say you're injured, or bedridden, or you're in another scenario where you can't exercise, or whatever the case may be, you have other options. And that's why I want to present all this stuff is so you know no matter what situation you're in, based on preference or realistic feasibility or effectiveness, you can alter your metabolism in multiple fashions to make sure that your body composition and overall energy intake is where you want it to be, whether that's loss, gain, or maintenance for that matter.

Dr. Andy Galpin

Today's episode is sponsored by Momentous. Momentous makes the highest quality supplements on the market, period. Many of you know me, and you know that I do not trust the vast majority of supplement companies, and for good reason. Many studies have shown that anywhere between 10% to up to 40% of supplements have accidental contaminants, intentional alterations, mislabeling, or other serious issues. But Momentous is different. I literally spent years vetting the company, their products, and leadership team before personally officially partnering with them in 2023. Every single one of Momentous's products is third-party tested to ensure quality, and many are even NSF certified for sport. Now, while I love all of their products, the ones I use the most, both personally and with my clients, are what I call the big three, and these are the omega-3 fish oil, creatine, and newly improved whey protein formula.

Dr. Andy Galpin

These three supplements have fantastic data supporting their benefits. Whey protein for lean muscle mass, omega-3s for brain health, and creatine for both muscle and brain support. And they have been shown to be very safe across basically all populations of people, young, old, men, women, et cetera. Now, nobody has to use supplements, and I hope you never feel pressured to do so. But if you're interested in supplements, it's important that you get them from the highest quality providers. You don't want mercury in your fish oil or lead in your whey protein

or anything like that. So that's why I stick exclusively to Momentous. If you'd like to give Momentous a try, go to livemomentous.com/perform to get 20% off your order. Again, that's livemomentous.com/perform to get 20% off. As I mentioned a moment ago, exercise calories tends to get most people's attention when it comes to the thing you got to do.

Dr. Andy Galpin

You got to work out more. You got to train harder. You're going to burn more calories.

Dr. Andy Galpin

I am actually in the camp that the caloric expenditure from exercise is playing a fairly minimal role in weight management. That said, there are a trillion other reasons why you should exercise, even if fat loss is your only goal. We'll talk about that later. But from a simple caloric expenditure, from a simple boosting metabolism concept, exercise is not playing a massive component. This is one of the few times in physiology when we can say that, "Hey, exercise is not the biggest hammer we can swing in this variable." More important is that NEAT. Now, that NEAT, as I mentioned, somewhere between 5% and 30%, and it is highly responsive. We've actually only known about NEAT for 20 or 25 years. James Levine has the famous paper here, I think it was 1999 that thing was published, where he outlined, he said, "Oh my gosh, this kind of fidgeting and walking thing feels completely unnecessary or it can't be contributing that much, is really making a big impact."

Dr. Andy Galpin

In fact, now we know that NEAT is likely the most modifiable one. It is ultra-responsive. It's the governor your body uses. When it needs to dial up energy expenditure, it ramps up NEAT. When it needs to dial it back, it ramps it down. It is absolutely the throttle your body is moving, completely unaware of your conscious thought, to regulate overall energy balance. We had no idea of this until, again, as I mentioned, 20 years or so, which is very recent scientifically. In that original paper, I think it's really cool because it's just going to hammer this point down. What they sort of found was something on the order of the NEAT accounted for a tenfold difference in fat storage when you're overfed. Now, I can't remember if this was in, I think it was an animal study. Certainly, if you're aware, we can put some comments in the YouTube section to help me out there, but it doesn't matter. The point was what they did is they overfed the folks or the animals in the study.

Dr. Andy Galpin

And what they realized was, again, a tenfold difference in fat storage based on the animals that upregulated NEAT in response to the overfeeding, and I think the correlation was like .8. Correlation of one is a perfect line. Correlation like .3 or .4 is still really important. So the fact that their correlation was .8 or more said, hey, this is basically exactly what is explaining folks who can eat more food. Again, they intentionally overfed this group. I'll call them folks, but probably

animals. And the ones that didn't gain the most amount of weight were the ones that responded almost perfectly for 50 extra calories eaten, 50 extra calories in NEAT. I made that number up, but you get the point, right? The ones that had 50 extra calories of food, 10 extra calories in NEAT were the ones who gained the most weight. And this is when our field completely turned the attention and said, "Oh, my gosh, it's not the 100 calories you're burning in your workout."

Dr. Andy Galpin

It is really whose physiology can match or is mismatched with their energy intake and their NEAT." And that is clearly one of the bigger than drivers of the faster metabolism person versus a slower metabolism person. To be really clear here What they are suggesting here is the folks who appear to have a faster metabolism are the ones whose bodies upregulate NEAT in response to upregulations or increases in energy intake. The ones who seem to have a slower metabolism are the opposite. Their body doesn't have a tight understanding or communication loop with energy intake, so even though they ramp up calories in, they don't see a huge increase in caloric expenditure through NEAT. And that thus then probably explains when you and your friend both increased your calories by 1,000 calories, yet you gained two pounds and she gained 15 pounds, or whatever the case may be. So that's why I wanted to make sure we cover NEAT, because it has that incredible role, and we will talk about what happens in different short and long-term scenarios with NEAT so we can really understand what we need to do to manage it and to take the most advantage of it, regardless of whether we're a fast or slow or in between metabolic speed person.

Dr. Andy Galpin

Now, the next two components that we talked about outside of EAT and NEAT are the thermal effect of food and resting metabolic rate. The thermal effect of food, as I mentioned, is somewhere between 8% to 15% of your total daily energy expenditure. What this is, is how many calories you burn breaking down food, and that differs based on your macronutrient. In fact, the reality of it is, it differs based on your food preparation. So if you ate a whole steak, as an example, in bites, versus that same exact cut of meat but pre-ground up, you'll see a difference in thermal effect, and it makes total sense. If your body's having to work to digest that whole big chunk, because you didn't chew it well, for example, of steak, it will take it more calories to break it down. However, if you pre-digest it, i.e., blend it up, chop it up, then it's less work. More chemical bonds have been broken. It'll be a very small amount, basically negligible, but conceptually, you're seeing the point here.

Dr. Andy Galpin

Your body won't have to spend as many calories to break it down. So the thermal effect of food is different based on the macronutrient profile. For example, fat has an effect of somewhere between 0% and 2%. Now, there are pros and cons. What this means is if you eat 100 calories

of fat, you're probably going to digest, absorb, and assimilate basically all 100 calories. This makes it highly effective for a lot of different things, particularly for storage, for keeping the calories around. If you're in a survival situation, if you want to use an extreme here, again, it doesn't matter. I know most of us are rarely in a survival situation, but just use it as the thought concept here. I don't want to waste a bunch of my calories of my food on breaking it down. I want to preserve as many of those calories from the small food that I was able to procure and keep those in my body. So fat has a huge advantage there.

Dr. Andy Galpin

However, from a weight management perspective, most of us being in a position where we have too much access to food rather than not enough, that can actually be a little bit detrimental because now I'm going to definitely take on all the calories that I eat. Contrast that to carbohydrates and protein. Carbohydrates are a little bit higher. Thermal effect is usually between 5% and 10%. What that means, let's just say again you ate 100 calories of carbohydrate, you might burn five or 10 calories breaking them down. And so the net result in your body is 95 or 90. And this is one of the main reasons why, not to get us on a tangent here or off track, when people say things like, "Oh, calories in, calories out don't matter," or, "I tried that and it didn't work," there's a lot of reasons that explain that, but the thermal effect of food is one of them. 100 calories of carbohydrate versus fat versus protein, just thermal effect alone is going to result in a different amount of energy absorption.

Dr. Andy Galpin

And so calories in, calories out is still perfectly explaining that. You just didn't fundamentally realize that the calories out portion is changed based on the macronutrient because of the thermal effect. So I have a separate video on YouTube. It's called the "Quality versus Quantity," I think, "The Great Calorie Debate" or something. It's an hour or two long. You can see exactly what I'm talking about. You can see some of the papers and plenty of examples, and we'll have that linked in the show notes. So if I lost you there, I apologize, but if not, just trust me. So to come back to this, the thermal effect of protein is the highest of these three by far, 15% to 30%. And so right off the gates here, you're probably intuitively thinking, "Okay, wait a minute then. If I eat 100 calories of protein, I may only have a net of 70 or 80 or 85. With that same 100 calories in my mouth, in the form of carbohydrates and fat, would have a much higher yield."

Dr. Andy Galpin

And so you can increase your metabolism. I'm going to lose you a little bit on math here. You can increase your metabolism, for those of you just listening, I'm air quoting right now, by eating more protein because you're going to actually be eating the same amount of calories as your friend, but the net result of calories you keep on board is much lower, therefore your caloric intake is lower, and therefore your body composition would change because of that. So this is a

case where it made you feel like, it gave you the perception of the metabolism being higher or faster because your net body composition result was better, body fat was lower, even though you ate the same calories, and you can't understand why because you were calorie matched. I will walk you through specific examples with numbers on this stuff later if I just lost you on a bunch of negative positives, up, down things there.

Dr. Andy Galpin

If not, I think you get the concept. I hope you do at this point. So thermal effect of food is an important consideration. Last caveat there before we move on to resting metabolic rate, and that is those numbers I gave you are very rough. When I say carbohydrate, yes, it depends on the type of carbohydrate. A scoop of honey will not give you the same thermal effect as a potato. So the way that you prepare your food, the preparation, how they're combined together, the starches versus glucose versus monosaccharide, yes, all this definitely matters. But that's why that number's a range, 15 to 30 for protein, five to 10 for carbs, zero to two for fat. So don't get ultra caught up in those numbers. Just think of it as conceptually, I'm burning a small but not irrelevant more calories for digesting protein than carbohydrates, and then certainly versus fat. Our fourth and final component here, your resting metabolic rate, is the thing people most associate with their metabolic speed.

Dr. Andy Galpin

Somewhere between 40% to 70%, and generally, you can think about this as folks that are highly physically active, whether that be from exercise or from NEAT, because they're burning more calories from there, by default, the number of calories they're burning as a percentage of their total daily energy expenditure goes down. So highly physically active people, their resting metabolic rate is sometimes only 40% or 50% of their total energy expenditure. As you get less active, all the way up to sedentary or completely inactive people, that resting metabolic rate may explain 70% to 80% of your energy expenditure. Want to be really careful here. Thus far, I've only explained these as a percentage of your total output. I'm not even talking about increasing or decreasing total output, so just as a percentage there. If NEAT is not the most modifiable one, resting metabolic rate is. These are the two places that you have the most short and long-term ability to interact and change.

Dr. Andy Galpin

Oftentimes, people will talk about resting metabolic rate, or you'll also hear the term basal metabolic rate. For purposes today, I'm going to continue to use resting metabolic rate, but I want you to be aware these are not the exact same thing. I don't think it's ultra important you know the difference today, but just in case you're wondering, they're both functionally measuring energy output in the body, but they do it in a little bit of a different way. Technically, basal metabolic rate is the number of calories your body needs to perform very basic functions at rest.

So if you laid there on a table, nothing was in your system, you were awake, how many calories is your body burning to pump your blood, circulate your hormones, keep your brain alive, so on and so forth? It is the minimum to keep you alive, and that's why they call that basal metabolic rate. Resting metabolic rate is the same thing, but it is the actual amount of calories you're burning at any given moment.

Dr. Andy Galpin

Your basal metabolic rate is pretty stable. We'll talk about how to increase that a little bit later. Your resting metabolic rate is completely responsive to what you just did. So if I gave you, let's say, caffeine, your resting metabolic rate, if I sat you on a table after ingesting caffeine, your resting metabolic rate would go up. However, that's not your basal metabolic rate, because your basal simply said, "What did I burn before or outside of the increase in response to caffeine?" So because we're talking about ways to increase metabolic rate, I'm going to mostly focus on resting metabolic rate. Now, as you'll see in our investigate discussion, we can measure this a lot of different ways, but just so you know what you're asking for, and I'm jumping ahead of the gun a little bit here, but since we're on it, I want to get it out now. A basal metabolic rate test has to be done after at least a 12-hour fast.

Dr. Andy Galpin

As I just alluded to, you can't eat before it. You can't have your coffee or tea or anything else. You can't be sleeping or listening to music. It needs to truly be a baseline if that's what you're interested in. A resting metabolic rate is way less stringent. You can do it under any condition you want. You have to understand how to interpret it that way, but it is functionally different there. So the usefulness, in my opinion, of resting metabolic rate is probably a little bit higher because it's a better understanding of what's happening on a day-to-day basis or what's going on in your real-life scenario, where basal metabolic rate, though, is more controlled, it's more scientific, and it does help you understand what's really happening in your body if you care. So that said, let's talk really quickly about how to measure these things. If you want to know your metabolic rate, your BMR or your RMR, how do I get these things tested from the highest quality gold standard all the way down to the cheapest, and I can't afford or have access to a lab, what do I do?

Dr. Andy Galpin

As I mentioned a moment ago, if you really want BMR testing done, please contact the lab that you're going to work with. You're going to have to do it in that setting, and make sure that you follow their exact protocols. And I'm saying this because I've had a lot of clients that I coach personally do this in the past, and their numbers come back completely funky. And I ask, "Did you follow all the exact recipe that the place told you to prior to?" And they don't. And so everyone does it a little bit differently, but almost always if you are going to a lab, say Dr. Mike Ormsbee's lab at Florida State, who offers services like this for somewhere in the neighborhood

of \$50 to \$75 or something like that. They will usually send you a list or an email that says, "Hey, the night before, do A, B, and C, and don't do this in the morning," and so forth. Follow those things perfectly. This is not a blood draw where you can kind of get away with some different things.

Dr. Andy Galpin

Everything that you're going to do, through your sleep, to the music you're listening to, and a number of other factors could influence the number. And if you want good data We've got to have excellent control. So if you're going to do that, follow those rules. So I just sort of alluded to it, but the gold standard here would be to get a test done in a laboratory. You can find them all over the place. I would personally, nothing against anybody, but personally encourage you to do this in a scientific laboratory if you can. There's plenty of clinics and pop-up facilities that do it, and some are good. Just my, again, personal experience, having coached a lot of athletes and a lot of non-athletes, I don't always have super strong trust in these places. They don't calibrate their machines often and so on and so forth. So if you go to a research facility that does this for a living, they have the scientific standard, and they've done thousands of these over years, you're just a little bit more likely to get better data.

Dr. Andy Galpin

So contact your local university if you can, if they have an exercise physiology department or anything like that, and there's a reasonable chance that they offer such testing. And again, the price point is, call it \$100 plus or minus, or a little bit lower. So that's the best way to do it. There's also some portable devices coming on board. I've tried a number of these. I don't love them yet, but I'm actually pretty confident they will get better in the near future. So I don't have a product to recommend to you right now because of that reason, but I have hope for that in the future. There's also other ways you can go about this. There are products that I know, for example, one called Caloryfy, where you can buy doubly labeled water. They'll ship it to you. You can drink it. You will collect your urine, ship it back in. Doubly labeled water, for the record, is one of the scientific gold standards.

Dr. Andy Galpin

And so this is fairly expensive. I think I paid \$1,000 for it.

Dr. Andy Galpin

I don't know. We've ran it through some people. Some of it was okay, some of it was really good, some of it wasn't as good. I'm assuming the price will get cheaper over time. It'll get better over time. So if you really want to know the exact number you're at and you have a little bit more disposable income, perhaps a company like Caloryfy, which I have no ties to whatsoever, I bought it a normal price that everyone else did. Or if you're needing a little bit lower price point or have other interests, maybe a lab is the way to go. In terms of wearables, they're generally not a

good solution. There's a lot of data on this. You will find some reports and some papers that suggest caloric expenditure estimates from a watch or a ring or a strap are okay, but most of them are not good. In general, they overestimate caloric expenditure. We've seen this for decades now. This originally started with the treadmills and the bikes and the stair climbers in gyms.

Dr. Andy Galpin

They tell you you've burned 1,000 calories in your workout, and almost ubiquitously, universally, they overestimated it. We've seen the same basic thing with wearables. They generally overestimate it by, honestly, an amount that makes it not worth it. If it's off by 15%, that's your entire margin of error. That's your window of opportunity to lose weight. So at that point, how useful is it? So if you want to use something like that or you already have one, that's great. Maybe it does track well for you. Awesome. But I wouldn't put a ton of stock in that. If you really are concerned about this, I would go to one of those other two options, or the third option, which is entirely free, and that is using scientifically validated prediction equations. These have been around for over 50 years. In fact, actually more than that. The one that we have used probably the most is called the Harris-Benedict.

Dr. Andy Galpin

I'm pretty sure that's about 100 years old, actually. Actually, I'm quite positive that was from the 1920s originally. It's been around a long time and validated in men, women, young, old, all kinds of different demographics. We use it a lot because there's actually a friend of mine, Andrew Jagim, at Mayo Clinic, has published a paper quite recently finding that the Harris-Benedict was more effective and more accurate, I should say, for specifically athletes. And so whether or not you're an athlete, it's probably not the defining factor, but this is generally probably the thing that is better for people who are maybe higher in muscle mass and higher in physical activity. So don't worry about the athlete part, but just think if you have more muscle than the average person and you're more active, maybe this equation is better for you. There are plenty of them. If you poke around, they are almost all free.

Dr. Andy Galpin

You can take your information, put it in. You can add additional physical activity modifiers. What I mean by that is they'll ask you questions like, "Are you lowly physically active?" So take these numbers in the equation and multiply them by 1.0. Are you moderate? Maybe multiply it by 1.2. Are you highly active? Are you extremely active? 1.3 modifier, so on and so forth. If I lost you, don't worry about it. If you, again, pull these things up, they'll walk you through it. You can enter some basic information about your age, height, weight, and so forth, and then it'll give you a rough estimate of your energy expenditure. So they're going to get you in the right ballpark. If you don't even want to do that, the easiest, cheap way to do it is just test, retest. What I mean by

that is measure your body weight, hold as many variables constant as you can, and then see what happens. If you're losing weight, you're in a deficit.

Dr. Andy Galpin

If you're gaining weight, you're in a surplus. I've used that more than almost anything, to be honest with you. I don't spend a lot of time on Harris-Benedict for high performers because ultimately I want to care about, well, are you going down? If you're losing weight too fast and you're not feeling as recovered, your performance isn't good, energy is going down, then I know we've underestimated calories and we'll bring them back up. If you're not losing weight, you get the idea there. If you're gaining weight, well, then you get the idea, or you're not gaining weight and we're trying to gain weight. So it's a little bit self-correcting is my point there. But nonetheless, if you want to get it tested, there's a handful of different options at different price points that are available, at least here in America, plenty of options, and then certainly the prediction equations are open to anyone in the world.

Dr. Andy Galpin

You can explore and use what is best for you and your situation. Today's episode is sponsored by LMNT. LMNT is an electrolyte drink mix that has an ideal electrolyte ratio of sodium, potassium, and magnesium, but no sugar. Hydration is critical to performance, both physical and mental performance. Countless studies have shown that even a slight degree of dehydration, even as small as 1%, can lead to decreases in physical output and mental performance. We also know that electrolytes are critical to proper hydration, which I've been harping on for years. But you can't do that, proper hydration, by only drinking water. You need to get the right amount of electrolytes in the right ratios, and that's why I'm a huge fan of LMNT. In fact, many of you will probably remember that I featured LMNT in my YouTube series on optimizing hydration nearly five years ago. I featured LMNT in these videos because their blend of 1,000 milligrams of sodium, 200 milligrams potassium, and 60 milligrams of magnesium really is unique and different than any other electrolyte on the market, and it has great scientific support.

Dr. Andy Galpin

I use LMNT constantly, particularly when I'm sweating a lot, and I routinely make it a part of my clients' optimization programs. If you'd like to try LMNT, you can go to drinkLMNT.com/perform to claim a free LMNT sample pack with the purchase of any LMNT drink mix. Again, that's drinkLMNT.com/perform to claim a free sample pack. Today's episode is also brought to you by Parker University. Parker is the only university in the world dedicated exclusively to human performance. It's also my new academic home. I first heard of Parker after attending their NeuroCon seminar and was stunned. I've been to countless clinics and conferences, and nobody is even close to Parker Seminars. The speakers, the setup, and the total experience are frankly jaw-dropping. All their seminars are great, but the upcoming Las Vegas show, which is

going down March 20th through 22nd, is going to be extra special. It's featuring speakers like Doctors Andrew Huberman, Tommy Wood, Gabrielle Lyon, and more.

Dr. Andy Galpin

But on top of that, I'm personally hosting a co-seminar at the same time. So imagine going to a phenomenal lecture on how the nervous system works, then popping over and lifting some weights with me personally, grabbing lunch, and then settling in for a talk on how NASA scientist Cody Burkhardt is preparing human bodies for life on Mars. Tickets for this incredible event are on sale now at a special rate of only \$599. But this price will increase as the dates get closer, so do not wait. And yes, you heard that right. \$599 gets you full access to the entire Parker Seminar, expo hall, nightlife and social events, plus two full days of learning and lifting weights with me in the gym and my friend Dan Garner. To see the exact schedule, list of speakers, and get signed up, visit parkerseminars.com. One more time, that's parkerseminars.com. I can't wait to see you there. So now that we've got this thing tested, you've got your data one way or the other, how do you interpret it?

Dr. Andy Galpin

Well, let's remember, resting metabolic rate alone is 40% to 80% of your total daily energy expenditure. And so we don't want to make decisions about all of our caloric intake based only on resting metabolic rate. We've got to have some sense of thermal effect, energy expenditure, and NEAT. This is why I'll go back to the previous conversation about saying what's actually happening in your body weight and composition is the ultimate answer because then it factors everything in by default. But nonetheless, let's just talk about resting metabolic rate. I don't know of any way at this point to measure NEAT outside of something like a step count, and this is where a wearable or a tracker would be effective. It's going to miss a lot of stuff, fidgeting, chewing gum, things like that, so they're not going to be great. But if you wanted to have a physical activity thing and get you maybe 80% of the way there, 70%, I don't know, that's probably a pretty good use.

Dr. Andy Galpin

Energy expenditure during exercise is quite simple. A heart rate monitor, a strap preferably, is the best way. If you have a wearable, that's fine. Again, they tend to significantly overestimate caloric expenditure. But if you have a heart rate strap, that's very likely to tell you the real answer and the real number. That is still the gold standard. The Garmins, the Polars, the ones that you buy off the shelf are the same ones we buy in our lab and have bought a button. I can't tell you how many hundreds of Polar straps in my career. And so that's one example of a technology and a product that is the exact same in the lab as it is on the consumer shelf. That will tell you your real number. So if you really do care about caloric expenditure, I would not use the data from the machine, the treadmill, the bike, or anything like that. Use a heart rate monitor. Use any

situation or setup that you'd like, and that's going to give you really strong data about where you're at.

Dr. Andy Galpin

All right? So again, can't do much about thermal effect of food, can't do much about NEAT outside of maybe a step count or accelerometer, something like that. In terms of energy expenditure, we use the heart rate monitor. In terms of resting metabolic rate, though, here's what we know about it. The range is enormous. I have seen people as little as 1,000 to well over 3,000. This sometimes tracks with body size generally, but not always. Such to say, I've seen people that are the same size with a resting metabolic rate of 1,000 and someone else their exact same size that's at 2,500, or the inverse. So it tracks roughly, bigger people tend to have a bigger RMR, but not specifically enough to where it's useful if you're actually trying to adjust based on calories. Men are generally a scooch higher for resting metabolic rate. 1,600 to 1,800 is a pretty common number you'll find collectively in the literature.

Dr. Andy Galpin

Women, more like 1,400 to 1,700. Okay? Now, remember, this is just resting metabolic rate, not total daily energy expenditure. And one of the things that you'll see happen is the differences between both sex and age in resting metabolic rate are explained almost entirely by lean muscle mass. And by entirely, I mean up to 80%. So I've kind of answered one of our questions for later now, but I'll hit it since we're here. Does your resting metabolic rate change or go down with age? And the answer is not nearly as much as you think. If it does, it's explained almost entirely by lack or loss of muscle mass. We will talk in more detail later about the men versus women aspect of that, but one more time, if you equate for muscle mass, we see very little, very, very little differences in resting metabolic rate between those two. And so off the cuff, we don't have numbers that I'm going to give you here that are men versus women for these exact reasons.

Dr. Andy Galpin

So I will cover the numbers in one second, but if you're wondering, "Man, is he talking about are these numbers for men, are these numbers for women, or why didn't he talk about women?" I'm not going to differentiate because, again, we have evidence that suggests it's not going to be different, so we don't need to specify it that way.

Dr. Andy Galpin

So the things that ultimately influence your resting metabolic rate in terms of interpreting that, I break them into controllable and uncontrollable factors. The latter are things like your height, your age, as we talked about, your gender, as we talked about. Neither of those probably influence it as much as you think. But there are other things. Clearly, your genetics, your ethnicity. You can't do anything about these, and they will absolutely change your baseline. But the list of controllable is far larger, and we'll spend all of our time today on that, and that's

everything from your activity levels, your nutrition and supplements and diets and drugs and hormone concentrations, activity levels, the environment you're in, the temperature that you're around, and so on and so forth. So there's a lot of things that are going to influence it, and it changes based on the day. There's an awesome paper that came out really recently.

Dr. Andy Galpin

Margaret Jones was a part of this. Andrew Jagim was a part of this, but it's called "Differences in Body Fat in Athletes Categorized by Resting Metabolic Rate." Bit of a mouthful there, but the reason I'm bringing it up now is it gave a table of percentile rankings of resting metabolic rate for men and women that range from the bottom fifth percentile to the 10th to the 20th, and so on and so forth, all the way up to 90th percentile. That paper is available in the show notes. You can pull up this exact table I'm looking at. So if you go get it tested or go get it estimated and you want to look at this table, you can see exactly where you rank. One more time, this was done in athletes, but I don't want you to think about this as, oh, it doesn't apply to you because you don't play a sport. Just think of this as a probably more muscular than the average person and pretty highly physically active.

Dr. Andy Galpin

The data are probably then going to explain pretty closely what's going on with you. But I had a couple of interesting findings from this, and I'll walk through the numbers here in one second, but what they found was expressing resting metabolic rate relative to body weight, or at least adjusting for independent factors, accounted for way more of a difference in body size than not. So it's allowed for more favorable comparisons. And I know I maybe just jumbled that up a little bit there. It was probably less clear than I could be. But what I'm effectively saying is if you were to take a normal chart and just Googled resting metabolic rate, you'll get numbers. If you're highly physically active and athletic, I think those numbers are different, and I think Andrew and Margaret's paper showed clearly that they are. And so I'm bringing this paper up now in this section because I think this table is a better one to use for these people, and I know a lot of you listening are pretty physically active, so you're probably more likely to fall into this category than you are someone who doesn't exercise and with high amounts of obesity or things like that.

Dr. Andy Galpin

And so I like this table better. It is a better resource. Rather than pulling up ChatGPT or something else and just started asking, "What's a good metabolic rate?" These numbers are significantly better. So what are you looking at? Okay, let's capstone this a little bit. For the bottom fifth percentile, if your resting metabolic rate, and now again, we're expressing this relative to body size, a low, the bottom fifth percentile, you're looking at in the neighborhood of about 22 calories per kilogram. The highest 95th percentile is about 31, 32, 33 kcals per kilogram. Again, the table breaks down everything else in between, but that's a pretty good

number to think about. A lot of the times you'll see resting metabolic rate reported simply as a number like I've done earlier, 1,500 calories, 1,200 calories. The more accurate way, though, is to do it, again, Andrew's paper showed this, but is to do it based on how much muscle size you have, and that's why you're seeing numbers like 25, 27.

Dr. Andy Galpin

If you're like, "What the heck?" It's divided by their body weight. So if you weigh 80 kilos and you have a resting metabolic rate of 20, which would be really, really low, kcals per kilogram, 20 times 80 would be 1,600, and you would have a total resting metabolic rate of 1,600 kcals. So hopefully that math made a little bit more sense, but the argument in this paper was quite compelling, and I think this is the better approach to it if you followed along with that. With that business now taken care of, it's finally time for us to get to our third and final I, and that is intervene. We need to break this up into a couple of categories. I'm going to call them acute and chronic, and what I'm really meaning here is what are things that will change your total daily energy expenditure in any four of the categories that are transient versus those that are going to make a long-lasting permanent change.

Dr. Andy Galpin

Couple of examples to make this tangible. The way that you want to think about these acute markers are these aren't necessarily establishing, say, a new resting metabolic rate. There's no baseline. So the example I gave at the beginning was caffeine, and we'll just stick with that because it's easy to understand. If you take caffeine right now, your resting metabolic rate will go up. It's not going to influence your thermal effect of food. Makes sense. But it may make you more physically active, so it may result in you burning more energy through NEAT, or you may be more motivated and able to work out harder, so your energy expenditure can go up. So you can see a single acute factor influence three of your four variables in that particular case. However, you wake up tomorrow morning, your NEAT, your energy expenditure, and your resting metabolic rate are going to be right back down to normal baseline.

Dr. Andy Galpin

And so chronic changes, though, are things like is your basal metabolic rate, that resting metabolic rate, now higher day to day to day to day? There's a lot of things, and you could really have an almost endless list that will acutely increase or decrease one of the four factors. But most people, when we're going all the way back to the beginning, if you're thinking, "I want a faster metabolism because I want to burn more calories and have a more efficient or effective system, have a different body composition," however people interpret that, you're most likely thinking, "I just wish I burned more calories doing nothing." That's effectively chronic changes. So can I increase my resting metabolic rate so that I'm burning more calories sitting around, right? I'll also talk about how things that necessarily boost your basal metabolic rate, or rather

your acute metabolic rate, won't necessarily always translate into body fat loss.

Dr. Andy Galpin

But wanted to establish acute factor versus chronic factors. Now, they are both important. Certainly things that will increase your acute resting metabolic rate, for example, if repeated days and days and days, and then therefore weeks and weeks and weeks, will simply result ideally in more calories burned, which will then increase total daily energy expenditure. But that distinction is important, what are going to be requiring more active continual practices versus ones that are passive and sustained for a long time. That's acute versus chronic. Let's start with the acute list. All right? And we'll go through both sections, by the way, acute and chronic, going through each individual factor, TEF, NEAT, EAAT, and resting metabolic rate. So starting with acute.

Dr. Andy Galpin

If you look at energy expenditure from exercise, clearly here you want to burn more calories, do more work. That's as simple as it could possibly be. But probably the more interesting thing here is, are there specific types or forms or modes of exercise that burn more calories more efficiently than others? And so if all you're interested in here is caloric expenditure, which ones should I choose? Well, ultimately, I'd say it doesn't matter that much. Pick the one you're going to have the most effort in, that has the lowest risk of injury for you, the one that you'll be the most sustained, that you'll have the highest throughput with in effort and repeatability, and that's the long answer. That's the real answer. But I know that's not what you're fishing for here. The reality of it is aerobic exercise, conditioning exercise, endurance exercise, however you like to term this, almost always burns more calories than strength training type of exercise.

Dr. Andy Galpin

I'm a strength training guy. I love it. I like lifting weights. I greatly prefer it. And this is one of the cases, though, where the caloric burn is just not that high. The honest reality, if you were to try, and in fact, I've spoken with colleagues in preparation for this show about this that have ran studies like this in the lab. I know of one person who's trying to figure this out, and the amount of strength training you have to do to match caloric output from a, say, steady state or even interval-based conditioning or endurance workout is really challenging. I remember being a grad student a long time ago, and my faculty member who was running the lab was very adamant about this, and I was like, "No way. No way." Because I was very much focused on strength training is better than cardio for everything. And we directly went in the lab and tested this, sometimes behind his back, sometimes with him there, and we just never got close.

Dr. Andy Galpin

We never got close burning the calories lifting, no matter what style of lifting we did. Circuit training, hard lifting, bodybuilding stuff, tons of high volume, and then you sit on a bike for 45

minutes, and you just smash the calorie output. So that doesn't mean I'm saying only do endurance work, or that it is better for all things, or that it is better for fat loss. But if the only variable we're looking at here is more caloric expenditure, almost always the endurance side of the equation will win out to the strength training side of the equation. Right? There's dozens of other benefits of why you want to lift and do a combination of these, probably for most effective long-term weight loss, but calories will not be it. In fact, as I talked about earlier, caloric expenditure overall with exercise is much lower than what many people realize, and so it's not a huge component of TDE. That's why we're going to keep this part of it short.

Dr. Andy Galpin

In general, though, one thing we can say is people who lift weights very routinely lose less muscle when in a caloric deficit. So one of the major reasons why you would want to lift weights if you're trying to lose fat is not the calories, but to preserve or even slightly increase if possible, and it is possible, by the way, to lose fat and gain muscle under certain circumstances. That's the reason why you'd want to do it. So the calories, great. You can burn 100, you can burn 150, 200, that's amazing. But you want to do it for those reasons of preservation or even increasing muscle mass. We'll talk about that down the road here about why that's critical to successful fat loss. But if you just simply look at the randomized control trials, look at the systematic reviews and meta-analyses, people that lift weights as a part of their fat loss strategy are oftentimes more successful in the short and long term, meaning they keep the weight off longer.

Dr. Andy Galpin

Now, nothing's perfect. Keeping weight loss off forever is a hard challenge, but more likely than not, if you incorporate strength training into that equation, you're more likely to have a successful maintenance or permanent loss of that fat. I think I've made that point by now. Let's go ahead and move on to the next concept. I talked about endurance, and I talked about strength training. What about something in the middle? High-intensity interval training is one that comes up commonly, and there's good reason for it. It's great, it's awesome, super effective, but there's also some misconceptions here. We need to clarify some of the things that we've heard a lot, and frankly things I've said in the past that were not necessarily wrong, but they're probably exaggerating the point here. So as we mentioned, the endurance side of the equation is probably better at burning calories during the acute exercise than strength training.

Dr. Andy Galpin

However, post-exercise, what differentiates those two is the caloric expenditure after the workout is done. If you do moderate to low intensity steady state work, basically as soon as you stop exercising or within a few minutes, your caloric expenditure goes right back down to baseline. What's happening is you start working out, you start burning more calories to match the calories needed to move. But as soon as you go down to rest, you come back down to baseline. When

you strength train, and specifically more when you do higher intensity interval stuff, whether that's with weights and a kettlebell, or pushing a sled, or running sprints, or any combination, we have a phenomenon called excess post-exercise oxygen consumption. We summarize that as EPOC. What we're referring to there is the extra oxygen consumption that happens after exercise has been completed. The easy way to conceptualize this, if you're done cycling for 20 minutes at 50% of your heart rate, seconds later, your heart rate's back to normal.

Dr. Andy Galpin

Your breathing's back to normal. However, if you did a killer bout of intervals, you're going to be huffing and puffing for many more minutes afterwards. Even after your respiratory rate and your heart rate feels like it's back down to normal, you will continue to be breathing higher than normal for potentially hours, if not much longer, five to eight to 10 hours after that exercise. And so that is the excess post-exercise oxygen consumption. You're continuing to breathe in. That is burning calories. The reason you're doing that is for a phenomenon that is not necessarily important right now, but the reality of it is that is real. And so when you want to account for a caloric expenditure from exercise, with that form of exercise, you have to account for the calories burned post-exercise. You can't simply look at what you burn in the workout. You have to continue to track the calories you're burning outside of that.

Dr. Andy Galpin

Some people will refer to this then as increasing your metabolism or resting metabolic rate. I have it here under the eat section because it's not really increasing resting metabolic rate. It's just a carryover. You're basically just continuing to burn calories from the exercise after you've finished it. Now, this is true. EPOC is real. It is much higher and it pretty much tracks with exercise intensity. The higher the intensity, the more EPOC. But the reality of it is it's not that many calories. We used to think it was several hundred calories. And so say you did an interval workout, you burned 200 calories in the workout, you might burn an extra 150 in EPOC. But it is substantially lower than that. You're probably looking at something more on the borderline of 30, 50 calories. Kind of depends. There's a large range there. And so it's not irrelevant. It all adds up eventually. I'll leave that up to you to decide whether or not 30 or 50 calories in the couple of hours post-exercise matters.

Dr. Andy Galpin

Maybe it's a little bit higher. But it's certainly not several hundred calories in most circumstances. I share all this information not to confer to you one mode of exercise is better than another for energy expenditure, but to actually share with you the pros and cons so that you can make this fit your system however you'd like. I personally prefer a combination of all three of them. What I like about the lower intensity steady state stuff is it burns a lot of calories, number one, and the recovery is really high. So it doesn't take much out of your system. You can repeat it and

therefore do it often. What I like about the strength training is the preservation of muscle. It isn't as repetitive and hard for some people mentally to get in there, but I'm not going to get a ton of calories out of it. What I like about the intervals is it's a short time domain. It sucks out your recovery window quite a bit though.

Dr. Andy Galpin

It's tough to recover from. But you get the benefit of the EPOC as well. So I like to use all three of them, but use what you feel best in your circumstances and preferences. Our next variable then is your NEAT. This is anything you think can help you move and be a little bit more active throughout the day. This could be things like standing desks. Most of the research is going to suggest they're going to burn an additional 100 to 200 calories per day. Kind of is a range. That number will be higher the more you're standing, it'll be higher the more you weigh. But that's a pretty standard number one would see. So helpful, but again, it's not 1,000 calories per day. It's not an enormous amount. You don't have to necessarily do them All day either, by the way. This is something that I thought Kelly Starrett did a great job of many years ago in telling people and helping us. He had a wonderful book on this topic, but you don't have to go all or none, which is to say you don't have to go all standing desk all day.

Dr. Andy Galpin

You can stand and sit and move about. That's personally how I do it. I'll stand, I'll sit, I'll go up and down. So maybe I'm burning an extra 50 calories or 100 calories per day, but this would be considered NEAT. Other things that have gotten more popular of recent are treadmill desks. I had an advisor a long time ago, probably almost 20 years ago, who was really into this stuff. He had a treadmill for his desk. I think he set it at one mile per hour. You can do some basic math there. If you do one mile per hour for one hour a day, you've walked one mile. It's about 150, 250 calories, depending on your size. So again, you don't have to be walking all day. I have a ton of friends who do this. I don't have one personally, but any time I can walk during meetings, that's what I do, and I have a lot of friends who will do that. So maybe you'll do it not when you're maybe typing or writing or doing things like that, but you're in meetings, you're on Zooms, and if you're walking at a very low speed, it's almost imperceptible.

Dr. Andy Galpin

You don't notice it, and you scratch out 100 calories here, 50 calories here, 75 there, and that's going to add up pretty substantially over time. Lots of other ways you can do it.

Dr. Andy Galpin

We've talked about exercise snacks before. We've talked about, at the beginning of the show, taking the stairs more. These things never really excited me because you're like, "Oh, I burnt 50 calories, so I walked more throughout the day." But the reality of it is, I actually had a client who did six 15-minute walks throughout the day, and that was his entire exercise. He couldn't do any

other stuff, didn't want to do it. He felt good. He did six 15-minute walks per day. That's about 400 calories. So that's actually quite substantial and honestly, far more calories than most people are burning during their really hard strength training workout. So you don't have to be that extreme. You can do three five-minute walks a day, three ten-minute walks a day. My friend Stan Efferding has been a huge proponent of three ten-minute walks a day, morning, noon, and night. You do something like that, you're easily going to hit a couple of hundred, maybe even 300 calories, and that is stuff that you're not going to get fatigued from it.

Dr. Andy Galpin

You can do it when you're tired, you can do it when you're sick, you can do it in all kinds of scenarios, and you can keep that NEAT a little bit higher, which will build up over time and make a big impact on your overall energy expenditure and body composition. Our third variable here is thermal effect of food, and this one's pretty simple. You can, number one, eat more total food. The more food you bring in, the more energy you're going to burn on digesting and absorbing food. But anyone who's paying attention right now is going to be like, "Well, wait a minute. Sure, I ate 1,000 extra calories, and so yes, I burned 100 more calories breaking down food, but I also then still had 900 additional calories." And so we'll hear this theme come up multiple times, but in this area of boosting metabolism, you have to consider the whole impact on your system. And so you could theoretically just eat more calories.

Dr. Andy Galpin

You'll have a higher caloric expenditure from thermal effect, but that's not probably getting you the ultimate fat loss result that you're thinking of. So that is one thing you could do. Another thing you can do here is keeping your calories the same, but increasing the percentage of your calories that come from protein. Now, I said that very specifically. I did not want to tell you just to eat more protein, because it's the same mistake I just made a second ago. I kind of set you up for that. If I tell you, "Eat more protein," and you just use that and increase total caloric intake, you're not going to see a change in body composition because you burned more calories breaking down the protein, but you had more total calories. And so the correct way to approach this is a higher percentage of your calories come from protein, which means you increase your protein intake, but then you reduce your carbohydrate intake, your fat intake, or a combination of both.

Dr. Andy Galpin

You hear this message a lot. It's very common and popular, and for good reason. I personally prefer to recommend protein as a total amount in terms of total amount of grams per day, and fats and carbohydrates as a percentage of your caloric intake, and this is exactly why. I want you to hit your protein targets, and we can play with the rest of your calories from fats and protein, but this is how we maximize thermal effect. And so if you and I are both eating 2,000 calories

and you're at 10% protein and I'm at 40% protein, well, now I'm going to have a huge win because I'm burning so many more calories of that same number in the form of thermal effect. So that's how you get the most advantage out of thermal effect, not just upping protein intake. I hear people say this a lot, and I know what they're trying to say, but I wanted to clarify that because it confuses a lot of people, and then they say, "Hey, man, I increased my protein by 80 grams a day and I didn't lose any weight."

Dr. Andy Galpin

And I'm like, "Ah, yeah, calories still matter." And what they meant to say was the percentages of your total caloric intake is the better approach there. Another sneaky benefit to increasing that protein intake by percentage is it oftentimes will reduce your total caloric intake. Handful of the other topics we're going to cover will do the same thing, and so when we're looking at strategies to regulate total daily energy intake, I'm trying to get multiple wins in one. A long-winded way here of saying, even if I held your calories constant and I upped that percentage of protein, the research is going to indicate likely you will spontaneously reduce your caloric intake by three to 500 calories. So I get a double win here. I get this increased thermal effect But in reality, unless you're in a controlled scientific study, there's a good chance you'll just spontaneously reduce your calorie intake, and that's because protein is more satiating.

Dr. Andy Galpin

It means it makes you feel more full. Not always the case, but a lot of people will have that response. It's well documented in the literature. And so from a direct calorie win, thermal effect, great. But probably the bigger benefit is that indirect you don't feel as hungry, you feel more full, and so you just probably eat less total food, which will have the perception of feeling like your metabolism sped up. "Wow, I'm eating the same foods. I'm eating all the time. I'm eating till I'm satiated all the time. I'm not starving or hungry, but I'm losing more weight. My metabolism must have sped up." Well, no, you just decreased caloric intake, but it felt like that. Right? Another sneaky trick here to boosting your metabolism, if you will. Today's episode is sponsored by AG1. AG1 is a vitamin mineral drink with probiotics, prebiotics, and adaptogens. Initially, I was extremely skeptical of AG1, as I am with all supplement companies, but after months of discussions with their lead nutritional scientist and the general team at AG1, I've been impressed by AG1's commitment to sourcing the highest quality ingredients and constantly updating their formulas to have the right ingredients in the optimal amounts.

Dr. Andy Galpin

AG1 also rigorously tests their products to ensure that every single batch is free of banned substances, allergens, heavy metals, microbes, pesticides, herbicides, residual solvents, and mycotoxins. It's even earned the prestigious NSF Certified for Sport third-party testing approval stamp. Now, most people in the performance space talk a lot about macronutrients like protein,

carbohydrates, and fats, and these are obviously critically important, but so are the micronutrients like vitamins and minerals. And even if you're eating a healthy diet, it's often hard to get enough of these vitamins and minerals, along with the probiotics, prebiotics, and adaptogens to keep your body performing at its best. It's for these reasons and many others that I personally take AG1 almost every day. Now, it's of course not a replacement for eating whole, healthy foods, but it is a great way to make sure that you're plugging in any gaps in your nutrition to improve your energy, bolster your immune system, and just generally help promote a healthy gut microbiome and more.

Dr. Andy Galpin

If you'd like to try AG1, you can go to drinkag1.com/perform to receive five free travel packs plus a year's supply of vitamin D3 plus K2. Again, that's drinkag1.com/perform to receive five free travel packs plus a year's supply of vitamin D3 plus K2. So our fourth and final category is that resting metabolic rate, and this is where we've got the most juice. In fact, there's eight very specific items I'm going to cover here, but I wanted to caveat all of it by making sure we remember here that these things change by the hour. So there's a lot of things you can do to alter resting metabolic rate, basal metabolic rate. I can't cover them all, but I pulled out eight very specific ones that I thought you would be most interested in. They have the most research behind them, that is the easiest to integrate, and they are the least kooky, is how I'll say it. The other final caveat here is remember, just because we acutely change your resting metabolic rate, that doesn't necessarily mean we're going to lose body fat in the long term.

Dr. Andy Galpin

We'll circle back to that later. But the first of our eight is what are called spicy foods. This is in the lore. People talk about it a lot. It's out there a bunch. Is it really real? Yes, technically it's true, although if you wanted to consider this to be a myth, I wouldn't push back that hard. This is how the field honestly works in a lot of the cases. It's officially there, but is it practically relevant? I'll just share with you the data, and I'll let you decide. Now, I'll tell you my personal bias. I love spicy foods. I put hot sauce or some sort of spice on basically everything I eat. I love it. I grew up not eating anything spicy, probably even into my mid-20s. Black pepper was too spicy for me. My family just growing up never did anything like that, but I learned to love spicy food when I started dieting. I started cutting weight and losing weight for competitions and combat sports and weightlifting and things like that.

Dr. Andy Galpin

Prior to that, I'd never done it. And I'm bringing this up now because I realized, man, spicy food really helped me in that caloric management. Number one, when things are really spicy, I at least personally tend to not eat as much. So I'm not going to gorge as much because I'm dealing with sort of a little bit of the pain and suffering. I'm more likely to stop a little bit early. I don't know if

that's really well documented scientifically, but it's certainly personally true for me. Additionally, spices, herbs, flavors can help you make food not taste as bland when you're really controlling stuff. So oftentimes, when you're managing calories, you're probably not putting on a flavor factor. You're managing fat, so you don't have the cheeses and the sauces. And so because of that, food can start to taste a little bit bland. The beauty of spices and hot sauces is they can be acaloric, and so you can make food taste different, and you can change it up and have more variety when your total actual food intake is not that different day by day.

Dr. Andy Galpin

So from a practical perspective, the work we've done with people that are trying to lose weight, and me personally, I love spicy foods. I use them a ton here.

Dr. Andy Galpin

Just think about exchanging out hot sauce or Tabasco for ketchup. Right? Easy win there. Ketchup has a reasonable amount of calories. You can get tons of different hot sauces that don't have any, and there you go. You've saved that 50 calories or 100 calories per serving, which adds up a ton. So from a practical perspective, I like it. If you don't, that's cool too. Does it do anything scientifically? Yes, it actually does. If you eat spicy foods, and most of the research here has been done on things like chili peppers, ginger, red peppers, and even turmeric, these will increase your resting metabolic rates, they'll increase your thermal effect of food, and they'll actually oftentimes lower energy intake, like I mentioned earlier. We've seen that routinely. There's actually been research on other spicy foods that wasn't as promising. I know that people have looked at mustard, horseradish, black peppers.

Dr. Andy Galpin

Those don't seem to do anything. But the other ones I mentioned a second ago do seem to do that, and they're effectively working by giving you a shot of adrenaline. So more specifically, they're increasing and activating beta-adrenergic responses. That's the long way of saying adrenaline or epinephrine, and getting a sympathetic drive. You'll see this pretty routinely, and you don't have to stretch your imagination too far to think, yeah, you eat something super spicy, and you get a little shot of adrenaline. All right? Now, at the same time, this is a classic Layne Norton. Dr. Norton, a friend of mine, always talks about people majoring in the minors, and this is a good example of that. So technically, does it increase metabolic rate? Yes. Does it do it to a level that you really care? Mm, not really sure. What you're functionally talking about here is probably three to five calories. So officially it does.

Dr. Andy Galpin

Does it matter? I don't know. You would have to eat an enormous amount of red bell peppers. You would have to probably eat ounces or pounds of ginger or turmeric for this to have a real practical output on you. So additionally, you get sensitized or desensitized to these things. So

you may not have the same response over time. I certainly know if you would've given me Tabasco 20 years ago, I would've had a much bigger adrenaline response than I do now. And so since we know that's the mechanism, is it then still leading to additional increases in my resting metabolic rate? I actually don't think it does. I would assume, me personally, probably nothing, because I'm so used to it by now. So when you balance the technically, officially, I could pull up a systematic review or a paper and show that it increases metabolic rate. If someone doesn't like it, or it's not a preference, or they're traveling, should you really be going out of your way to strongly encourage spicy foods for people to boost metabolism?

Dr. Andy Galpin

I don't think so. Probably not the biggest win. So while I technically have this on our list, again, if you said this is on your list of things that don't work, I wouldn't push back that much either. Moving on then. The second on our list is actually, surprisingly enough, water intake. There is more than a small amount of research on water increasing metabolic activity. If you think about this for a couple of seconds, it makes perfect sense. I actually know one paper specifically looked at, I think, 16 or 17 ounces of water and found that it increased resting metabolic rate by 10% to 30% for about an hour. Now, practically, I wouldn't recommend chugging water all day. Opt to be hydrated. But think about what it does. If you're ingesting something at a temperature that is lower than the temperature inside your stomach, by putting that in there, you'll have to burn calories to heat that water up.

Dr. Andy Galpin

In fact, that is actually, by the way, the strict definition of a calorie. It's the exact amount of energy it takes to raise, I think it's one gram of water one degree, something like that. It's pretty close. The definition of a calorie is how much energy it takes to increase the temperature of water. So by definition, if your body is working to increase the temperature of your water, then it is going to be burning some calories. Now, there's also some, and I wouldn't call this extensive, but some research on then, by extension of logic, colder water might be of more benefit than room temperature water. It should theoretically take more energy to heat up. Okay? But probably the bigger benefit here, if there is one at all, is satiety. So I know of, again, another study off the top of my head here in overweight individuals, and they gave them, I think something like a half a liter of water, which is a reasonable amount to drink, 30 minutes before a meal.

Dr. Andy Galpin

And that group eventually lost more weight. And so what you're probably looking at here is a lot of people I've heard in the vernacular say things like, "Oh, a lot of the times when you think you're hungry, you're just thirsty." I don't know if that's necessarily true or not, but having dealt with a lot of folks who have to lose weight over time, again, athletes and regular people, I will say in my personal coaching experience, making sure you're drinking water will help you reduce

calorie intake, the amount of food you eat in a meal, and so forth, with really no consequences to digestibility unless you're going extreme with it. So water is another potential option you can turn to. The effect will be minimal, but you start stacking some things on top of each other, and you need to drink water anyway, so not something I would say to overdo, but just making sure you're not under-hydrated is probably the biggest win here.

Dr. Andy Galpin

A similar concept here, but probably more effective, is using a different form of temperature regulation. That is the temperature in the environment you're in. So there have been several studies that have looked at lowering the thermostat in your house by even a few degrees, and that can lead to substantial and significant loss of body fat over time. Same exact concept here. If your body has to work a little bit harder to keep itself at a certain temperature, that is caloric expenditure. You've boosted your metabolism, and it will result in a practical and meaningful loss of body fat. Now, I wouldn't necessarily advocate dropping the thermostat so much that you're freezing and your fingers are frozen and you can't type and work, but maybe a notch or two. I have friends that have done this a lot over the years. where they bring it down one degree for three months, bring it down another degree, bring it down another degree, and just slowly work themselves down three or four degrees, where they used to keep their house at 72 degrees, and now they keep it at 66, or something reasonable like that.

Dr. Andy Galpin

If this feels like majoring in the minors to you, fine. Again, my position here was just to share with you all the data that we know of, let you know how much it works, how well it works, and then you can decide what to deploy, what to disregard or not based on your situation and circumstances. All right? So playing with temperature, whether it is colder water or colder environment, is another option and probably more effective than the spicy food thing. But still, I probably haven't sold you a ton on things that are really going to move the needle, but we're going to change that here soon. Fourth on our list is something I've talked about now, and that is caffeine. There is a lot of data on this. I will summarize the entire field, but you can generally expect something between a 3% to 11% increase in resting metabolic rate that's going to last somewhere between an hour to three hours. This is very well documented, pretty easy.

Dr. Andy Galpin

It's a stimulant. It's going to rev up energy. It's going to tell your body to expect energy output, so it's going to get you going. Nicotine is next on my list, and it has a very similar effect. The magnitude of effect is a little bit smaller, generally more like 5% to 6% increase in resting metabolic rate, and it's going to last for the same 60 minutes to 120 minutes, something like that. Now, I personally don't use nicotine. We've used it in some clients. They've asked for it, and we've done it with some success there. I personally like to avoid it as much as I can, but those

data are there and use it how you will.

Dr. Andy Galpin

Similar, and now we're up to number six on the list, is green tea or green tea extract. You'll see this abbreviated a lot as GTE. It has similar effect of caffeine, but in the 4% to 5% range for about the same length and duration. As we've mentioned for some of the stuff prior with water and spicy foods, one thing that has been documented pretty consistently with caffeine, nicotine, and green tea, is they all also affect satiety. And so they're appetite suppressants. So is the benefit really in the elevation in resting metabolic rate? I don't know. Maybe yes, maybe no. But if it helps you just not feel as hungry and not then overeat, that's probably the real win. But options nonetheless, a lot of people are already consuming these things. I don't think you need to go in there and add additional stimulants to your life if you're already on them. You don't have to use these at all, but one more time, they are options to use or not at your discretion.

Dr. Andy Galpin

Number seven on our list is a combo. I had to do it this way. If not, the list would've been 50 things or more. And I'm generally going to call these thermoregulators. So this is a handful of herbs and drugs and other stimulant-like factors that are going to have a similar impact as caffeine and green tea and so on and so forth. But they're not in those forms. Just to give you a couple of examples, wonderful scientist, Bill Campbell, friend of mine in Florida, has done some work in the past on guarana. You can Google that one up there, G-U-A-R-A-N-A, combined with other elements. Much of the research in this field, and the reason I'm calling them thermoregulators, is because they're rarely single ingredient things. So they're multiple herbs combined with multiple different things and combinations and cocktails, and so you don't know what the individual effect is. But nonetheless, in these multi-ingredient thermoregulators, in Bill's study in particular, I think he did it in young healthy men, probably the college kids that are running around his lab.

Dr. Andy Galpin

And they saw about a 10% increase in resting metabolic rate for about three hours post-exercise. Now, what I liked about Bill's study in particular, of course, because he's such an awesome scientist, is they had a placebo group, and they reported the placebo group. What I mean by that is the placebo group had a 3% increase in resting metabolic rate. So if you actually kind of cancel that out, you could still see about a 7% bump in RMR here, which I think their data was something like it took them from about a group average of 1,850 calories to 2,000. So 150 kcal bump from this guarana-based multi-ingredient supplements. Tons of other studies have been done like this. One in particular, I know actually several of them have used things like caffeine plus GTE plus herbals and stuff like that. And if you go back to the numbers I just gave you on green tea and caffeine, combine them with other ingredients, you'll see about a 10% total

increase, again, going to last two to three hours.

Dr. Andy Galpin

Others have been done on caffeine, GTE, and niacin, combined with actually something called Garcinia cambogia, which was the original primary ingredient in Hydroxycut. You've probably seen Hydroxycut in commercials all over the place. I think there was actually a bunch of problems with people with getting liver failure, so they took this ingredient out of it. So it's no longer in there, to my understanding, but it was in the original formulation. But nonetheless, you throw all those things together and you might see a 15% or greater increase in RMR. Last one here, similar, caffeine plus GTE plus yohimbine. Another one showed about a 15% bump. So you can basically see here kind of no matter what combination you have of these stimulants and herbs, about the higher end of the impact is a 15% or so percent increase for about two to three hours. Right? Whether that fits in what you like and how you live your life, that's up to you.

Dr. Andy Galpin

I personally don't use any of these for fat loss clients. It's not how we approach it, but if you want to, there's the data, make your choice. Number eight on my list is getting good sleep. Now, you don't have to be perfect here, but one of the things we know happens with really bad sleep, even on a single day, is people tend to seek out more total calories, and it makes sense. You're tired. You feel like you're in a low energy state. You're going to want to get more energy. That's exactly what your body is doing, and it is a natural response. This has been shown extensively in the literature. Under acute fatigue from lack of sleep, people will search out more total calories and also search out food items that tend to be higher energy density. You can think about these as junk foods if you'd like. I know personally, I search after carbohydrates. I don't know why, but I really want more bread.

Dr. Andy Galpin

Not that the bread is bad for you, but I really want carbohydrates when I'm fatigued. Again, intuitively, it actually makes a ton of sense. This is the primary and fastest energy source for your body, but that one hits me very directly. So I know that's something I have to watch out for and has been shown multiple times. Most people are like that, and the physiology makes intuitive sense. So if you're wanting to then, quote unquote, "speed up your metabolism," ensuring you're not in a spot repeatedly where sleep is bad. Therefore, it's not that your metabolic rate has changed, but you're going to make worse food choices, and so your total energy intake is higher, which means your intake versus energy out, that balance is off, which is then going to lead to eventual body composition changes. So there's more to say on that, but if you're a little bit confused on why that is on my list, it's not necessarily that sleep will enhance your metabolism.

Dr. Andy Galpin

But bad sleep can have a number of negative impacts, and one of them being behavioral

changes, specifically with food and calorie intake. One thing that will suppress acutely and chronically, as we'll talk about later, your total daily energy expenditure, and specifically RMR, is really bad sleep. NEAT specifically will go down in the presence of poor sleep, acute and chronic. The one night of bad sleep is probably not a big deal, but magnified over time will make a huge impact. So your NEAT is going to go down, your drive for worse food choices and more food overall will increase. Energy expenditure might also go down. You know it's harder to work out. You're not going to take the walks. You're more likely to skip your training sessions or condense them or just get through it when you've had a bad night of sleep, and you also are going to potentially see reductions in resting metabolic rate.

Dr. Andy Galpin

And so for me personally, what I do when I have a bad night of sleep, and it happens. I have kids, and I travel, and all kinds of things happen. Three things I do to mitigate this damage. Number one, what I've already talked about. I will double, triple down as much as I can on protein. Basically, I'm trying to crowd out other foods. So when I know I just really want to go for burgers and fries and stuff like that, and I know it's because I slept for three hours the night before, I'm going to smash a double scoop of protein. I'm just going to keep it really, really high. I still might go get those foods, but I just don't have the physical space in my stomach anymore. I get full. Now, of course, occasionally I'm a person, I'll just go have the burgers and fries. I'm not neurotic about it. But if this stuff happens somewhat regularly, you can't always fall into that trap. At some point, you need to make sure you don't do that.

Dr. Andy Galpin

Willpower is one way, but personally, I just make sure I'm smashing protein throughout the day to reduce that risk. Second thing I do is I make sure I hit all that low-level energy expenditure stuff. So maybe I don't have it in me to do my interval training or my assault bike or run my hills or whatever, but I'll make sure I walk. Let's move around. Let's get three or four of those 10-minute walks in. No matter how tired and sleepy I am, or sick, for the most part, you can probably get yourself to walk. Those couple of hundred calories are going to add up, especially, again, if this happens frequently. A sauna is another good one. Sauna is not a replacement for exercise. But hey, you can a lot of times convince yourself to take a hot bath or a sauna and get something out of the day. Third thing I do, and this is going to stun people, but take a nap. Go ahead and actually just sleep. You could suffer all throughout the day, making worse choices and skipping your workout.

Dr. Andy Galpin

Or maybe that 30, 60, or 90-minute nap, while you're going to feel like you're not working that time because you're not, if it substantially enhances the quality of the next 10 hours of your day, sneaking in a little bit of nap may change everything and is a good thing to do, again, when you

magnify this stuff over time. Another thing I wanted to fold in here before we left, we spoke about this at the beginning, but to be really clear, and that is the impact of age on metabolic speed. For a long time, we have said, and you'll see this all over the Internet, that it goes down as you age, and it may some, but more recent research suggests that most of that is being driven by a lack or loss of muscle mass. So if you preserve the amount of muscle you have as you age, you should not see that much of a decline in your metabolism. If you look at folks, and this specifically happens in that early teen to early 20s range, where people say, "Wow, I eat kind of the same, and now I've all of a sudden gained these 5 or 20 or 40 pounds in the last couple of years."

Dr. Andy Galpin

And they look back and they think, "Well, I used to play sports and now I don't." Yeah, these things are all true, but the reality of it is, as you get past that and you start getting into the 20s and 30s and 40s and 50s, most of your change or perceived change in metabolic speed is a function of losing muscle. Remember, muscle explains up to 80% of your resting metabolic rate. That's the thing that will really change it and drive it. So that's a nice little lead-in to what we're going to talk about next, which is how do we make sure we have not only acute, but chronic changes in our metabolism? So let's get into those options right now. The acute changes we just got done discussing are mostly beneficial if they can lead to an increase in either energy expenditure or NEAT. The chronic ones are probably going to be more predictive of long-term fat loss. I used an example earlier, and we'll do it one more time to finish out this point.

Dr. Andy Galpin

If you, say, ingested caffeine, and you looked at your rate of fat oxidation or fat burning, it would go up. Your resting metabolic rate would go up. But if you just sat there on the couch for the next three hours, what will happen likely is not only will it come back down to baseline, but then it actually might go below baseline. And that's your body's way of saying, "We gave you more potential energy, but you didn't do anything with it, therefore, we're going to balance that back out by lowering energy." And I'm saying that to say while we just covered eight different ways to enhance your metabolism acutely, they may not have any impact in long-term fat loss if you didn't use them to actually burn more calories. You then need to use the caffeine to give you more energy to work out harder or longer, and that's been shown extensively, or the green tea extract, or the spicy foods, or whatever the case is.

Dr. Andy Galpin

So you want to think about acute activators are ways to give you some motivation, if you will, to get you up, to help you move more throughout the day, to burn more energy. But if you just increase fat burning and then you don't use the fat, that fat will get stored right back again and your net result will go nowhere, and so they don't have a broad, lasting impact on fat levels. I

really needed to make sure that point was clear because when we now get into these chronic adaptations, that's what will functionally change your net result with what you're finally looking for. But this system gets tricky, because as I just alluded to, it will adapt and respond. So what works your first week, or six weeks, or six months may not continue to work, and it can give you a false sense of a slow metabolism, or that calories don't matter. That's not the case, but the system changes. So what is going to move it, and then how do I anticipate and prepare for and adjust based on my body's response to a changing target?

Dr. Andy Galpin

Going through the four different areas, these first ones are very fast. Thermal effect of food. There's nothing really here. I don't know of any way to chronically increase your thermal effect of food. I guess the closest analogy or thought we could have here would probably work in the opposite direction, which is to say something like theoretically, and there's some reason to think this is the case, chronic changes in your gut microbiome may actually upregulate or downregulate enzymatic activity that makes you more efficient at breaking down certain macronutrients. If you don't eat much protein, or you change the type of protein you eat, and then you chronically ingest it, you will increase the enzymatic activity needed to break those things down. And so you'll actually probably get more efficient at breaking down protein. That's why if you're not used to, say, eating a steak, and then you have one, your stomach might feel really heavy, or, "Oh my gosh, that's hard to digest."

Dr. Andy Galpin

But people that eat it every day don't feel that same thing. I have no issue at all digesting red meat, but I eat it really constantly. If you were to bring something in your stomach I'm not used to, you get the idea there, may have some issue. So the only thing really to think about thermal effect of food chronically is if anything, it might get lower because you've changed gut microbiome properties to be more efficient at breaking that food item down. So instead of burning 20%, maybe it's now down to 15%. So I don't know necessarily the case here, but we'll certainly say we'll check this off the list of things that will change chronically that'll enhance and speed up my metabolism. So we got to go somewhere else. Next ones up are then NEAT and EEAT. So in terms of NEAT, again, we don't really have much of a chronic effect here. The only thing I can maybe argue would be if you have made something into a pattern and a habit.

Dr. Andy Galpin

So say you go for those three 10-minute walks a day, and you do it so much that it becomes a pattern that you stick to it more often. I guess we could call that a chronic effect. But that's not really changing your levels at baseline because as soon as you stop walking, that number comes right back down. So not really a chronic benefit we can see there. The one thing we can say here is what we talked about earlier, in the people who have a close relationship between an

increase in caloric intake and an increase in NEAT are the ones who are most likely going to be described as your fast metabolizers, and ones that don't will be your slow. Other than that, again, we don't have really a chronic effect on NEAT. So we struck out on thermal effect. We struck out on NEAT. What about energy expenditure from exercise or EEAT? Eh, kind of the same boat. So on one hand, energy expenditure during exercise, the more fit you are, the harder you can train, the more you can do it, and you can recover, and so you should be burning more energy.

Dr. Andy Galpin

But on the other hand, the more fit you are, the more efficient you become. You're more efficient in your mechanics and your movement. Enzymatic profiles have changed and upregulated and downregulated, and oxygen utilization and capitalization have improved, and so your energy demand per work is lower. All washed together, it pretty much negates itself. So we're not going to get much benefit from that either. Which then leaves us To the real shebang here, and that's resting metabolic rate. This is the one we're after and the only one that really matters in terms of me officially saying, "Yes, we have boosted your metabolism in a way that you care about and will matter." Got a handful of ways to do that, and the very first one is sleep. We talked about this with acute, but the impacts of sleep are far better explained from the chronic side. Enormous amounts of data here, and much of it is very recent.

Dr. Andy Galpin

In fact, we had very little understanding of the metabolic ties between sleep and metabolism until the last really 10 years or so. Now, the relationship between sleep and metabolism is bidirectional. We talked about bad sleep changing metabolism a second ago, but it goes the opposite direction as well. A bunch of research I could pull up here, but a couple of ones that I've found most interesting that I wanted to highlight. One study in particular that came out of the University of Chicago a number of years ago looked at 10 overweight individuals, and they put them on a 14-day caloric restriction protocol. In one of the times they went through the protocol, they slept eight and a half hours. The other time they went through the protocol, they slept five and a half hours. So again, university controlled calories in both situations. The only variable that changed was three hours of sleep. So now we're not even talking about the impact of bad nutritional choices.

Dr. Andy Galpin

This is simply even if calories are matched, what happens when you sleep more. All right, now, the sleep curtailment groups, the group that slept for five and a half hours, had a reduction in fat loss by 55%. In absolute terms, you're talking about the difference between 1.4 kilos versus 0.6 kilos. So almost a full kilogram difference in fat loss that favored the group who slept more. The same thing basically happened in terms of muscle mass.

Dr. Andy Galpin

You can't directly measure it in the study, but it's called fat-free body mass, and just think of it like muscle mass. And this was about a 60% difference. So absolute terms, you're talking about 1.5 kilos versus 2.4 kilos, so almost a full kilogram or about two pounds of lean muscle difference. This is substantial. Remember, this is 14 days. That's it, and all they changed was sleep, and we see pronounced increases in fat and reduction in muscle growth with just this variable change. All right, so what you can see there is additional stuff that they looked at, actually, fat oxidation, satiety, I think as well was in there, but really problematic things going on when you sleep poorly. That relationship, if I had to summarize the literature, you're going to see a 10% to 60% increased likelihood of obesity with bad sleep. So there's a chronic effect here that is very, very real. One more time, it's bidirectional.

Dr. Andy Galpin

So we see what I'm meaning there is if you are overweight, you're probably going to have worse sleep, but worse sleep is actually going to cause overweight. So the cause goes both directions there. A really nice paper came out pretty recently. It'll be up in the show notes. You can check it out specifically on the relationship between obesity and sleep and how it goes both directions. You can see those details in that. But another thing that has been identified in the literature there is the direct relationship between muscle mass and sleep, and it goes the way that you would predict. Not only does more fat oftentimes equal worse sleep, but more muscle oftentimes equals better sleep. So two independent things happening there. Not enough muscle, bad. Too much fat, bad. There's a relationship as well there, but they are separate, and we need to acknowledge that. So it's not only important to make sure we're not over fat, but that we have muscle as well.

Dr. Andy Galpin

This is actually an area that's getting a lot of scientific attention right now that people don't necessarily realize, and that is normal weight obesity. You heard that right. Normal weight obesity is so people whose total body weight is not exceptionally high, but their body fat percentage is really high. Probably not kindly put, but you may know this more colloquially as skinny fat. The more proper term is, again, normal weight obesity. But this is an area, again, scientifically that's getting a lot of attention right now because of acknowledgment of things like that. It's not necessarily just about body weight, but the quality of that body weight matters a ton. More research on this chronic tie between resting metabolic rate and bad sleep. Very, very famous study in the field called the Sleep Heart Health Study. This was self-reported sleep. Folks that self-reported less than five hours of sleep per night had, and this is going to stun you here, this was associated with a 251% increase in their hazard ratio of developing type 2 diabetes.

Dr. Andy Galpin

Now, type 2 diabetes and obesity are not the same thing, but obviously, there's a strong relationship there. What we're seeing here is just general metabolic dysfunction with bad sleep. Similar things have been done with impaired insulin signaling, specifically in adipose cells. Those are your fat cells, in folks who sleep five and a half hours versus eight and a half hours. So we're seeing this in a lot of different forms and fashion. In fact, one of the papers, and I'm going to quote it directly here because it's so powerful, specifically said that, quote, "From a clinical standpoint, our study provides additional evidence that insufficient sleep may contribute to the development of or exacerbate metabolic disorders." I can tell you in my coaching experience, it is really, really hard to manage body composition, and thus metabolic rate, in somebody who is truly chronically sleeping really poorly.

Dr. Andy Galpin

It is tough. You got to fix that sleep or at least improve it before we expect major changes in body composition. One night of sleep, not a big deal. Bad nights of sleep, though, you're probably going to expect a reduced resting metabolic rate, which is why it's in our chronic section, and a big hammer to swing. Number two on our list is going to surprise some people, but it's actually fish oil. Now, this is a really interesting one. We know of the many benefits of fish oil, but many don't realize the metabolic ones. Easy study here to highlight what's going on. Twenty-four females, and they did this in, I think they were over 60, 66 years old, if I'm remembering exactly the age range there. And they gave them three grams per day of EPA and DHA for a total of 12 weeks. Now, what's cool about this study is they actually matched it with olive oil. And so calories were equated for. One group got the olive oil, which is obviously a very healthy food choice, and the other one specifically got fish oil.

Dr. Andy Galpin

And so really into a smart study design here because they, of course, matched calories, they matched fat, and they gave them not really crummy food items or low-quality stuff, but two high-quality items. And so what that allowed them to do was tease out the direct effects of the EPA and DHA. Net result here, and remember, this is chronic, so what happened not in the 60 minutes or 90 minutes or three hours post taking the fish oil, what happened at rest 12 weeks later? About a 15% increase, 14% actually, I think, increase in resting metabolic rate. They saw an increase in energy expenditure during exercise by about 10%, and the fat oxidation rate, both at rest and exercise, were increased about 19% and 27%, respectively. What's probably more impressive than all that, though, is they saw an increase in lean mass by about 4%. Take a second to digest that. By simply taking three grams per day of fish oil, not a high dose at all, you saw a chronic elevation in resting metabolic rate that had a functional and practical outcome of a 4% in lean mass compared to olive oil.

Dr. Andy Galpin

Now, what do you think this would be compared to of a lower quality fat or a worse food choice in general? It would probably be substantially more. So to me, this is incredibly impressive, and it is another reason why taking fish oil is probably a really smart strategy. But in full honesty here, and candidly, I didn't know this. I had missed this one. I was pretty aware of basically everything that we talked about so far this way, but I had absolutely no idea that fish oil would chronically do this at rest over time. So pretty powerful, pretty low-hanging fruit, and a pretty easy win in my opinion. Next up, something we've already mentioned before, and that is adding lean muscle mass. Now, we've been saying this for a long time, and this is something I need to offer an official correction on. I have misspoke on these words many times in the past, as many people did. We would often tell people that for every pound of lean muscle you add, you burn an extra 30 to 50 calories per day.

Dr. Andy Galpin

More realistically, that number is significantly lower, probably closer to six to maybe 10 calories per day. So what I mean by that is muscle is metabolically active, and so just being alive, being on your body costs you calories to sustain. But that calorie cost is about, again, six to 10 calories per pound of muscle. So in that example, if you were to add seven pounds of muscle, you will probably expect to increase your resting metabolic rate by about 40 to 60 kcals per day. Now, is that a lot? Is that not a lot? I'll let you decide, but just basic math there. If I take that and I say, okay, that's about somewhere between 1,200 and 1,800 calories per month, which is four to five, six pounds per year, pretty conservatively. There again, there's your 10 to 15 pounds over that five to 10 years. So we know that it burns calories. We know that it explains a huge percentage of the variance of your resting metabolic rate.

Dr. Andy Galpin

We know that it's the primary thing describing the difference with age. It's the primary thing describing the difference with male and female. And there are many other studies that I could bring up to show that, but I think we've made this point, and I hope you believe me by now. So let's go ahead and move on and talk about other things. And by other things, I mean the fourth and final thing on our list, and that is exercise. Now, the question about whether or not exercise chronically changes your resting metabolic rate is tenuous. We don't actually have full scientific agreement here. Here's where the field basically stands.

Dr. Andy Galpin

We know that it is particularly good at keeping your resting metabolic rate high when you're on a low-calorie diet. So that alone, again, I don't know that it will increase you above baseline, but we know that when you reduce calorie intake, just like when you increase calorie intake, it raises your metabolic rate. If you chronically suppress caloric intake, you will then eventually lower your

resting metabolic intake. It's going to match it. So with that in mind then, if you're on a calorically restricted diet for a long time and you exercise, you will not have nearly as much of a drop in resting metabolic rate. So it will preserve current resting metabolic rate rather than increase it, which is a benefit in and of itself. There's also extremely good evidence that when you go from even moderately active to completely sedentary, that resting metabolic rate goes way down. Same thing has actually been shown with high-level athletes, specifically endurance athletes, when they drop training.

Dr. Andy Galpin

So their normal level of training, and they bring that down a little bit, resting metabolic rate will come down as much as 10% or more. And so while we, again, can't make an argument that this stuff will necessarily boost RMR, it may stop it from going down. If it does boost it, it's probably going to go back to the point from earlier, which is because it yielded an increase in total muscle mass. But we've already covered that point, so what we're trying to tease out right now is, does this have any additional benefits outside of just giving you more muscle? Now, you can look at some systematic reviews and meta-analyses here, but generally, here's what you're going to find. Strength training tends to have the biggest win here.

Dr. Andy Galpin

Fun. Going back to the beginning of our show, remember I said it doesn't have the biggest win in terms of caloric expenditure, but it does have the biggest win in terms of chronic boosting and elevation or maintenance of your resting metabolic rate. Usual effect size here, or effect rather, is about 100 kcals per day. The data are mixed. Probably could be mostly entirely explained by muscle, but the number you're going to see is about 100. In terms of the aerobic exercise side of the equation, it's closer to 50 to 60 kcals per day. So it seems to be substantially lower for a number of reasons.

Dr. Andy Galpin

At the same time, because of that, lots of studies are going to say that it has no effect or minimal effect, and probably what's happening is that number is kind of on the borderline of the ability to reach statistical significance. So depending on the study design, some studies find that it crosses the threshold and it is a significant, albeit small effect. In some, it's just not enough to cross that threshold. So minimal effect, if any, there with chronic endurance exercise. So because of that, the research on mixed methods of training, protocols that incorporate both strength and endurance, it actually lines up pretty much perfectly. The average increase in RMR there is about 75 kcals per day. So endurance exercise maybe gives you 40, 50 kcals. Strength training, maybe 100. You do a combination of both, you're going to meet in the middle in that range somewhere. All right? So that's the best you can hope for in terms of chronic exercise elevating your resting metabolic rate.

Dr. Andy Galpin

One more time, a billion reasons to exercise, but that's probably not our biggest win relative to our sleep or our fish oil or some of the other things we can do. Our fifth and final one is short because we've mentioned it numerous times now, and that is simply eating more. Your resting metabolic rate will adjust to your chronic energy intake. It won't do it that much or relevance on the day-to-day basis. But if you are repeatedly eating high amounts of calories, your resting metabolic rate will adjust up or down. So that all being said, I wanted to tie this thing together and wrap it up by talking about what is realistically going to happen with some of these acute and chronic changes, and how do I wrap that into a complete picture or a program or a protocol that one might use? You have to keep in mind the fact that, as I said at the beginning of our chronic section, it's a bit of a moving target here.

Dr. Andy Galpin

Here's what I mean. As you lose weight, the equation changes. Thermal effect of food tends to go down. Why? You're eating less food. Okay, so we lose some calories to that. NEAT tends to go down. There's a great paper, Herman Pontzer at Duke is probably most famous for this adaptive thermogenesis or this conservation idea. I know that Eric Trexler and Abby Smith Ryan and Layne Norton published a paper at least a decade ago now showing and arguing for the same thing. But what's most likely happening here is NEAT is the first response. So when your body senses the fact that you're in a low caloric state, it's probably going to bring down your caloric expenditure through NEAT. In the coaching realm and the weight cutting realm, this is what we call the shoulder lean. So you know somebody is really low on calories because they start leaning up against tables. They start sitting down more. Their elbows get placed upon stands and desks and things like that, and they're doing this subconsciously, but how we always justify this is their body knows they're in a low caloric state, and so they want them to sit down and rest more, and so they're really lowering that non-spontaneous activity.

Dr. Andy Galpin

Anyone who's ever dieted or brought calories down for a long amount of time knows exactly what I'm talking about here. After that, if you were to continue to be in a low caloric state, you're now going to run into actual reductions in resting metabolic rate, especially if you've lost physical size and especially if you've lost muscle with that. So that can happen over time. So you've lost thermal effect of food. You've lost NEAT. You've lost resting metabolic energy expenditure, and you'll probably will even go down in your EAT. If you are smaller and you're doing something like running, if you have less mass to move, you burn less calories. And so what happens here is all four of those factors can come down, so eventually you either have to then reduce your calories more or artificially increase your energy output more to make sure that you're continuing to lose weight. And so one of the reasons that people tend to plateau in fat loss is because they're not accounting for these things to go down along for the ride.

Dr. Andy Galpin

Now, I don't want to leave you on such a confusing note, and so what I'd like to do now is just quickly summarize exactly what we've covered today and then give you a couple of real practical examples of how you could combine some of these things to have an effective total daily energy or resting metabolic rate or boosting metabolism protocol that's going to put you in the best position possible so where you don't have to suffer some of these long-term conservation or adaptive thermogenesis problems. So we started off by talking about a handful of acute factors. In terms of thermal effect of food, the basic thing you're doing here is eating a higher percentage of your food in the form of protein. We then talked about NEAT. Now, it's just effectively strategies like standing desks and walking treadmills that can help you move more throughout the day. From the energy expenditure perspective, most likely you'll burn more by doing endurance or aerobic type of activity, or even higher intensity intervals.

Dr. Andy Galpin

The last component then for our acute factors was our resting metabolic rate, and we covered eight specific factors there, everything from spicy food to water or cold water, to cold air or temperature in your room or work environment, to caffeine and nicotine and green tea and other thermogenics or thermoregulators there. And then we finished by talking about having great sleep to make sure you don't put yourself in a bad food choice position. Once we got through all that stuff and we remembered acute effects don't necessarily chronically change into long-term adaptations, and so what are the things that are going to really boost my metabolism over time? We didn't see a lot of opportunity there in thermal effect, not a lot in energy expenditure or NEAT, and so really we had four main components from the resting metabolic rate perspective, and that is getting great sleep, fish oil at three grams per day, adding more muscle, and then fourth one on our list was adding more calories.

Dr. Andy Galpin

So the higher caloric place we could be in while maintaining overall body composition is going to have us having the highest and fastest metabolism possible. So now that that is all in our mind, I want to give you a couple of examples of how you can put this together. I picked a caloric intake and expenditure of 2,500 calories just to give us a starting place. So let's say your goal was to reduce caloric balance by 500 calories. That would equate to about one pound per week, 500 multiplied by seven is about 3,500. That's roughly how much calories or energy goes into a pound of fat. Not exactly how it works, but that's pretty close. I picked these numbers on purpose. One pound per week is a really good number. I use it a lot. That's almost always what we go after. If you have a lot more weight to lose, you can go a little bit higher. If you have less to lose, maybe a little bit lower. But it's a really good starting place for sustainable long-term and effective weight loss that will stay off.

Dr. Andy Galpin

So not a mistake there. But nonetheless, I'm going to give you three different options of how you could get to that 500-calorie deficit. Option one is to simply add 500 extra calories of exercise. You don't want to change your nutrition, don't want to change anything else, you don't want to get a standing desk, you just want to work harder. That's fine. You can do that. I'll tell you, in my opinion, that's pretty hard. Number one, you don't burn nearly as many calories in your workouts as you think. Try sitting on a bike with a heart rate monitor on and getting to 500 calories. If you're big, it's a little bit easier, but if you're moderate to small, that's quite a lot of work. So it's not impossible. It's an option. Plenty of people have done it.

Dr. Andy Galpin

But it can be tough, especially if you're trying to use more calories than 500.

Dr. Andy Galpin

This is a hard go. All right? So in addition, you got to be really concerned about what's going to happen to NEAT. Remember that adaptive thermogenesis? If you burn a bunch of calories during exercise, there's a really good chance your body will reduce NEAT that day. So if you burn 500 calories in the seat of the bike, your body might drop your NEAT by three or four or even up to that 500 calories as a way to conserve your body weight. And so you can win here, but a lot of folks who have gone through this where they're like, "Man, I trained so hard. I was killing myself in the gym, and then my weight didn't move at all." There could have been an issue with not necessarily measuring your calories right and so on and so forth, but the reality of it is, at least according to Dr. Ponzer, it's possible that your body was just adapting your NEAT to match your eat, so your body didn't move anymore.

Dr. Andy Galpin

So that's one option. It wouldn't be my top choice, though, because of those reasons. Another option would be the opposite, and that's you cut off 500 calories from your food. Candidly, this is much easier. I've done this a lot. It's possible. Sometimes it's unsustainable. Some people have a hard time with hunger, and some people have a hard time regulating food intake. Others don't have a hard time, so you can use it. It will drop resting metabolic rate, though, remember? Lower calorie intake means lower RMR. It also might drop NEAT. If you're one of those folks that have that relationship and you have a strong tie there, you might go down. So you might be chasing your tail a little bit there. If you're doing it in a way, especially if you're not having enough protein and you're not strength training, this might also long-term result in more muscle loss, which will drop your RMR. And so while again, it can be successful, I think it's as limited as the previous approach.

Dr. Andy Galpin

And so just getting all your calories from more workouts, possible, but probably not the best

approach for most people. Getting all your calories by just eating less, again, possible, but probably not the most approach. If we're using all the information we learned today, we're going to use some sort of combination. You have four ways to manipulate this. You have thermal effect, you have exercise, you have NEAT, and you have a bunch of ways to alter resting metabolic rate. Use any combination. I'm going to give you one sample, but please, by all means, use whatever fits your preferences, as I've said all day today. So just one example to strike you up here. Let's say you needed to burn those 500 calories, and you were able to increase your energy expenditure from exercise by 200 calories. Maybe you did a little more on the bike or whoever knows, right? Combination of circuits and lifting weights and whatever, but 200 additional calories.

Dr. Andy Galpin

Sounds really easy. Trust me, it's harder than you think. And so I think 200 is a pretty reasonable number, especially for somebody who's already exercising, to do an additional 200 calories per day. It's a decent amount more work. I actually don't think much more than that is that realistic for many people. So 200 calories, you're going to feel that, but we got there. Now, that's how I got my energy expenditure from exercise. In terms of resting metabolic rate, maybe I'm going to add that fish oil and that green tea. If you ran back the numbers I talked about earlier, that might get us an additional 25 or so calories. So not a huge effect there, but we're stacking things on top of each other. Taking some fish oil and having a cup of green tea per day is not a super hard thing to get a lot of people to do. So we're going to stack some wins here. Then for thermal effect of food, I'm going to switch out 15 grams of fat out of my diet, which is about 135 calories, for 30 grams of protein.

Dr. Andy Galpin

Maybe I just take a David bar. There we go. Maybe you got a couple of sticks of Maui Nui or protein powder, whatever you want to do. Now, that alone did a couple of things. Those 30 grams of protein are about 120 calories. Those 15 grams of fat is about 135 calories. So that alone, we bought 15 calories, but more importantly, we're taking advantage of thermal effect of food. So we drop that 15, we're preserving lean muscle mass more. We've added to satiety. Maybe then we'll not have a harder time, diet will be easier. Maybe we'll reduce calorie intake. But in addition to that, we got another 30 or so calories from that 10% thermal effect from those 120 calories from our protein intake. So net together, the 15 from the lower calories, plus the 30 from the thermal effect, got us another 45 free calories. Now, I know you're maybe hearing this and you're like, "Oh my God, he's talking about 20 calories and 45."

Dr. Andy Galpin

But in my experience, to be honest with you, this is how you make caloric restriction feel easier. No one that's going through this feels like they're on a crazy diet. I worked out a little bit, 15

grams of fat out, 30 grams of protein in. I feel full. I'm not feeling like I'm starving all the time or I'm super restricted. I'm not also on a crazy all-protein diet or anything like that. You're talking about a pretty small change that's going to add up effect. Okay? Another change you would make here, maybe you do drop your calories one way or the other. In this example, I just said, "Okay, let's cut carbohydrates by 20 total grams." That's 80 calories. So we did a little bit of caloric restriction. We did a little bit of switching out macronutrients for the thermal effect. We stack all that on top of a little bit of NEAT, which is a 15-minute walk at lunch. Gives us another 100 or so calories.

Dr. Andy Galpin

So you add all that stuff together, a couple of hundred calories from exercise, 25, maybe 50 calories from fish oil and green tea. Another 50 calories or so by switching out our macronutrients. Another 100 calories or so by cutting out a little bit of energy from, let's just say carbohydrate, and then a walk per day. All that together is going to get you your 500 calories. You're going to do that in a way that doesn't make you feel super hungry. It won't smash your NEAT. It won't smash your resting metabolic rate. You won't lose muscle over it, and you won't have as many issues with that adaptive thermogenesis, which means you'll be able to hold all that weight off a lot longer than in other approaches. I know we covered a lot of ground today, and I apologize about all the acronyms and the TEFs and the REMs and the things like that. I know we got a little bit technical with our math, but I wanted you to have some actual direct, practical numbers.

Dr. Andy Galpin

One of the reasons I believe we have so much confusion in this area of metabolism and boosting your metabolism is because there's too many generalities thrown out there, lack of specificity with terminology, and so people have got confused, and I hope this provided you some clarity. I hope it was actionable for you in your own individual practice, your coaching practice, or just simply sharing with a friend who's interested in this field. In reality, you have a lot of ways that you can work on your metabolism. While I have to break some hearts and let you know you can't speed up your metabolism and there's really no such thing as a fast or slow one, in practicality, you can have that net result that you're actually looking for with subtle changes in your total daily energy expenditure, what makes it feel like your metabolism is faster. So all that to say, if you implement any of these things, I would love to know about it.

Dr. Andy Galpin

I would love to hear about it, whether it worked or didn't, and if it did work for you and you had success with it, I give you full permission to go around telling the world that Dr. Galpin said I have officially sped up and boosted my metabolism, and I will not tell the world any different. Thank you for joining for today's episode. My goal, as always, is to share exciting scientific

insights that help you perform at your best. If the show resonates with you and you want to help ensure this information remains free and accessible to anyone in the world, there are a few ways that you can support. First, you can subscribe to the show on YouTube, Spotify, and Apple. And on Apple and Spotify, you can leave us up to a five-star review. Subscribing and leaving a review really does help us a lot. Also, please check out our sponsors. This show would not exist without them and their exceptional products and services.

Dr. Andy Galpin

Finally, you can share today's episode with a friend who you think would enjoy it. If you have any content questions or suggestions, please put those in the comments section on YouTube. I really do try my best to read them all and to see what you have to say. I use my Instagram and X profiles also exclusively for scientific communication, so those are great places to follow along for more learning. My handle is @drandygalpin on both platforms. We also have an email newsletter that distills all of our episodes in the most actionable takeaways. We have newsletters on how to improve fitness and VO2 max, how to build muscle and strength, and much more. To subscribe to the newsletter, just go to performpodcast.com and click Newsletter. It's completely free, and we do not share your email with anybody. Thank you for listening, and never forget, in the famous words of Bill Bowerman, "If you have a body, you are an athlete."