

THE MODEL **HEALTH** **SHOW**

EPISODE 606

The Truth About Protein, Muscle, & Longevity

With Guest Dr. Gabrielle Lyon

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SHAWN STEVENSON: Welcome to the Model Health Show. This is fitness and nutrition expert Shawn Stevenson, and I'm so grateful for you tuning in with me today. Do you know what your muscles are really for? Are they just about looking good, are they just about my humps, my humps, my lovely lady lumps? What are the muscles for? Now, of course, we can look at things from a practical standpoint and see that our muscles are utilized for functionality, to be able to do stuff in the world, kind of important, but there are some specific applications that our muscles have with longevity, with preventing disease, with being able to protect us from injuries and recovery that are just mind-blowing that you're going to learn about today. There might not be another organ or organ system in our bodies more associated with longevity than our muscles. So, we're talking about extending our lifespan and our health span. And our special guest today is one of the leading experts in the world in muscle-centric medicine. So, we're really going to dissect this in multiple ways and understand muscle at a whole different level. And this is one of those wonderful things that we can get access to today from the world's best through mediums like this. And I'm very, very grateful for this conversation because truly it's going to blow your mind and add something to your life that you can use for many years to come.

Now, we're also going to be talking about protein today as well and some of the dynamics around protein and the misconceptions around protein. And this is mind-blowing in its own right, because if we're looking at muscle building and maintenance, protein is the mechanism by which our muscles are going to be built, but it's not just our muscles, even our immune cells are built from proteins, and our hormones are built from proteins. We really don't think about that and how vital these amino acids are to bring in because our body simply can't make what it doesn't have. So, to be able to build higher form cellular structures, we need to be able to bring in the raw materials, the building blocks to make the magic happen. So, when it comes to protein and fitness, a lot of people tend to think about the protein supplements. Obviously, food first, but protein supplementation has been done for literally thousands and thousands of years. The most studied is whey protein. And even as far back as Hippocrates, who is well noted to be the father of modern medicine, this is often given the title to Hippocrates. He utilized whey protein for his patients, as something for healing and rejuvenation, he called it, "serum."

He had the serum for you. Alright, but again, thousands of years of documented use, but you've got to keep in mind today and in the way that things are done versus what Hippocrates was doing can be very different. But what about whey protein in the clinical setting, does it really stack up to have benefits? Well, the study that was published in the Journal of Nutrition found that overweight test subjects who were instructed to consume whey protein daily for 23 weeks

in this particular clinical trial lost more body fat, had a greater loss in waist circumference and had a greater reduction in circulating ghrelin levels, this is your major hunger hormone, compared to test subjects who were drinking soy protein or an isogenic carbohydrate drink. Alright, now, what's really interesting about this the study is that the test subjects were not instructed to make any other dietary changes or lifestyle changes at all, just adding in more protein from whey protein led to these results. And a lot of manufacturers aren't paying attention to the quality and thoughtful intentional processing to actually retain the nutrient profiles, to make sure that it's bio-available and not denatured, and also avoiding all of the crazy artificial colors and artificial ingredients that can find their way into many protein supplements out there on the market.

This is why I highly recommend you check out the grass-fed whey protein or the plant-based protein from Onnit. They're doing things the right way, highest level of quality, no artificial ingredients, none of that stuff, just the highest quality proteins that you're going to find out there. So, if protein is one of the things that you're shooting for, get it from people that are doing it the right way, that are paying attention to quality, that care about performance, and also, they hold themselves to the highest standards, and they even invest in clinical trials for a lot of their supplements. So Onnit is one of those rare companies that's just doing stuff the right way. So, head over there, check them out, it's onnit.com/model. That's O-N-N-I-T.com/model. You get 10% off their whey protein, their plant-based protein, their incredible pre-workout. Again, they've done clinical trials for their efficacy peer-reviewed data, and also their foods are amazing as well. They've got fat butter, have you had Onnit's fat butter? So good. It's a combination of, this can be the almond butter, they've got a peanut butter, and they've got a snickerdoodle. Alright, they got like it's blended with chia seeds, coconut oil, super tasty stuff. And again, done with efficacy. Head over there, check 'em out, onnit.com/model, that's O-N-N-I-T.com/model. Get 10% off of everything they carry. Head over there, check 'em out. Now, let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five-star review titled, “awesome information always,” by Jacenta Worth. “I started listening a few years ago, and each episode makes me go, "Wow!" Such intriguing information, and it's presented in such a fabulous way to keep your attention and be able to retain and use the information in the future. I have now got my husband, co-workers, and mom hooked too, keep it up, please.”

SHAWN STEVENSON: Amazing, that's what it's all about. Thank you so much for sharing that over on Apple Podcasts. I truly do appreciate it. If you're yet to do so, please pop over to Apple Podcast and leave a review for The Model Health Show, and on that note, let's get to our special guest and topic of the day. Our guest today is Dr. Gabrielle Lyon, and she's a Washington University fellowship-trained physician, and her post-doctoral training was a combined research and clinical medicine fellowship in nutritional science and obesity medicine and

geriatrics. She's board-certified in family medicine as well, and Dr. Lyon completed her undergraduate degree in Human Nutrition, Vitamin and Mineral Metabolism at the University of Illinois and continues to be mentored over the past two decades by one of the leading protein experts, Dr. Donald Layman.

Dr. Lyon is the founder of the Institute for Muscle-Centric Medicine, and she works closely with special operations military leaders and mavericks in their perspective fields and has a private practice that services patients worldwide. She's just one of the smartest people that I know, I'm really excited to share this incredible conversation with the amazing Dr. Gabrielle Lyon. Welcome back, I absolutely appreciate you. And whenever I get a chance to hang out with you, something special is going to happen. So welcome back, Dr. Gabrielle Lyon.

So, I'm really grateful to have you back because there's so much just buzzing around right now about longevity.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: And you have a perspective that is so deeply rooted in experience that so many people don't have, and you just called it right out that most people are just kind of ignoring and not really understanding the science behind in this longevity equation, and it has to do with muscle. So having you back to talk more about muscle is so exciting, as a flex a little bit, as they say it. So, let's dive in deeper today and really talk about this connection with muscle and longevity.

DR. GABRIELLE LYON: Yeah, I can't wait, and I really appreciate this conversation because what we're hearing right now is that in terms of longevity, we should reduce our protein intake, and that seems to be the overarching narrative. And what is so surprising to me as a trained geriatrician, and for people that don't know what that is, that's specializing in individuals over the age of 65 and end of life. Part of my job is managing individuals in nursing homes, and part of my job as a fellow was looking at their brain health. Running a brain clinic at Wash U. That is no small task as a geriatric fellow, and one of the things that we always look at is strength, capacity, and activities of daily living. When we think about that, arguably we think about skeletal muscle, so right now the conversation is geared towards longevity, which by the way, is not defined. When we talk about longevity, specifically as individuals talk about reducing dietary protein, are we talking about reducing longevity by six years? Are we talking about living six hours longer? There is no hard endpoint in this nebulous concept of longevity. When we think about survivability, you have to think about skeletal muscle. And skeletal muscle in an aging population is critical, it is the pinnacle, it's not the peripheral discussion, it's not, we should eat this, maybe our carbohydrates are too high, it's none of that. Skeletal muscle is an endocrine organ, it is our body armor, you have to protect it as you age.

SHAWN STEVENSON: Okay, you just said something that really jumped out at me. You said body armor.

DR. GABRIELLE LYON: Yeah. Yep.

SHAWN STEVENSON: So, I've been thinking about this from an evolutionary perspective, why would we have the capacity to build and put muscle on our frame?

DR. GABRIELLE LYON: Muscle is the amino acid reservoir. Every time you are not eating, your tissues, your brain, your liver, your kidneys, all require amino acids, a steady state of amino acids, in a fasted state, the place you're going to get that, skeletal muscle. The body is constantly going over a process of turnover, it's not, you don't stimulate muscle and that tissue stops being active. This is a constant process. Skeletal muscle is really what is going to maintain you in times of fasting, it's going to maintain you in times of injury, illness, we know... At, cancer. We know that survivability of cancer is increased with the amount of skeletal muscle you have, and these are really big factors and we're totally avoiding the fact that skeletal muscle is the primary organ system of protection.

SHAWN STEVENSON: So, can we talk about... So, this is looking at what's happening internally, what about externally? If I think about it, when there's a time, I'm conjuring up images of swords and shields and these kinds of things. And so, when you said body armor, that really jumped out as literally kind of like a protective mechanism. Like, "Why am I able to grow these pecs?" They might maybe protect my heart or something like that.

DR. GABRIELLE LYON: Well, I think that the concept of skeletal muscle is really all-encompassing. We can never say... Listen, take out the body building community, which perhaps is a bit at that cusp-end of intensity in terms of skeletal muscle, but the body was designed for movement. And right now, we have an opportunity to not move, but we're a human machine. The human machine was designed for hard physical labor. Does that protect us? It definitely protects us in a multitude of ways, balance, strength, flexibility, survivability. If you go back to the times of swords, I'm sure the guy that had the most well-conditioned muscle was the individual that was going to survive.

I mean, I, of course wasn't... It's just my perspective, I wasn't around during that time. But when we think about survivability, skeletal muscle, while not easy to put on, requires time, and attention, and dietary changes, you can't eat the way you did in your youth when you are primed for anabolic growth, that does transition, which we will definitely talk about. And that goes to the point of why protein restriction is so dangerous for an aging population. Because as we age, as we think about protecting our body, our body armor, that amino acid reservoir.

And there's so many things that we're going to talk about as it relates to skeletal muscle. Number one, the fact that it allows us to aid in protein turnover, which is ongoing. But also, skeletal muscle, there's so many things. Skeletal muscle is one of the primary sites of insulin resistance. And we cannot go one day without hearing about insulin resistance.

SHAWN STEVENSON: Yeah, it's an epidemic. Absolutely epidemic.

DR. GABRIELLE LYON: And we think about it as it relates to obesity, but insulin resistance. There is evidence that insulin resistance begins in healthy 20-year-olds that are sedentary, a decade before we're seeing changes in liver abnormalities, a decade before we're seeing changes in triglyceride levels, blood glucose, insulin. Insulin resistance of skeletal muscle is one of the primary defects of... I don't want to say all, but nearly all the diseases that we're seeing. Heart disease, cancer, obesity. Skeletal muscle needs to be our focus as opposed to looking at the periphery, which is adiposity.

SHAWN STEVENSON: This brings us back to, you mentioned cancer, and being a protective mechanism there. So, I was just wondering in my mind, what are all the pieces that could make that possible? I'm sure that, of course, insulin is going to be one of those factors.

DR. GABRIELLE LYON: Well, obesity is a known risk factor for cancer. And cancer is very broad, cancer is a disease of the genome, they're multiple different kinds of cancer, but the things that we can do something about, really relate to getting our body composition in check. Not only that, not just that skeletal muscle is going to protect you with cancer cachexia, which is, cancer can be a very highly catabolic state, and we've seen individuals who are going through chemo, or have cancer... In clinic, when someone has rapid weight loss, one of the things that you think is, cancer.

It is a highly catabolic state, it destroys skeletal muscle, and an individual's survivability is going to be better if they have healthier skeletal muscle. I also want to mention something else. Not just that skeletal muscle is protective from the mechanical aspect, from the amino acid reservoir, but exercise. Exercise is, I don't want to say broadly anti-cancer, but it definitely can interface with the immune system, and it can definitely help protect against certain kinds of cancers. Exercising skeletal muscle increases natural killer cells. It increases an interface with the immune system and with the inflammation in the body. It counter-balances inflammatory mechanisms in the body.

SHAWN STEVENSON: It's so powerful and it's so simple.

DR. GABRIELLE LYON: It's so simple. And you know what we really need to do, is how do we bridge the gap between fitness professionals and medical professionals? Right now, when we

think about skeletal muscle, oftentimes we think about physical fitness. Physical fitness is incredibly important. And the way I think that we think about it is a bit simplified because we really need to bring it into an interface of medicine. Movement is medicine. Muscle is medicine. Do we have an obesity crisis? Yes, but what we really have is a muscle crisis.

SHAWN STEVENSON: So just to lean into that specific thing, this gets me back... Body armor is my favorite thing today, alright, body armor. And even with the development of that muscle is going to make us more efficient in certain movements.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: So, moving that sword forward, or being able to do things more efficiently, more powerfully, generating more force, more power. So, there are very practical things here, but this internal chemistry is so fascinating. Because if we're looking at... You just said this keyword too and what... It's one of the big takeaways from today, is increasing our survivability.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: So, increasing our resilience against all manner of, not just chronic diseases, but infectious diseases as well, and we talked about that the last time you were here. So, putting all this together, this is something we have access to, that, if we're talking about exercise, it's virtually free, you don't need a lot to be able to this. You just need some physical literacy to be able to engage with this.

DR. GABRIELLE LYON: I like that, I like that word, physical literacy. It's interesting, we talk about NASH and fatty liver, well, you can't really train your liver. People could argue, "Well, does obesity start in the liver first? Does it start in skeletal muscle?" Well, skeletal muscle makes up 40% of the body weight, and last time I checked, I could not exercise my liver. You, you're amazing, maybe you can, but...

SHAWN STEVENSON: My liver has some abs, for sure.

DR. GABRIELLE LYON: But this is exactly what you said, something free that we can leverage, that has become optional for movement.

SHAWN STEVENSON: Yeah.

DR. GABRIELLE LYON: And it's not. We are... There's no such thing as healthy sedentary behavior. But in the literature, people will say, "Well, this is a healthy sedentary population." And I would

argue that when we look at the domains of healthy sedentary, we're already looking at insulin resistant individuals. We are already looking at defects in skeletal muscle that are happening a decade before. And if people really care about obesity, cancer, heart disease, Alzheimer's, you have to care about skeletal muscle longevity. If we continue this conversation about reducing dietary protein with the goal of increasing that nebulous longevity, what are we doing to the quality of life? What are we doing to protect ourself? You're talking about upregulating this gene and there's all this... It's kind of like when you build a house, you can put pretty drapes on it, but what about the reality of being tough, being strong, being resilient, knowing you can go a period of time without eating and still be absolutely fine, right? Being able to leverage your physical proneness to implement a capacity of anti-inflammatory effects, anti-cancer effects. Exercise and physical activity improve nearly every domain of our life, and yet we are still trying to fix obesity. But I believe these things begin in skeletal muscle first.

SHAWN STEVENSON: Yeah. Yeah. This isn't something that's getting prescribed as frequently. The education is just so lacking. I'm so grateful for you. You mentioned something which is... This is a sad state that we're in, where we have peer reviewed studies that say healthy sedentary population. That's like an oxymoron, straight up.

DR. GABRIELLE LYON: Right. Exactly. Thank you. Yes. And so, the data that we have, many times when we are looking at aging, we don't even know what is possible, because older adults are typically more sedentary. And so, when we look at a lot of the data, we're looking at older sedentary adults, which are healthy, but I would say that is a unhealthy population, even if we have yet to see aberrant changes in markers, whether it's CRP or triglycerides, the health of skeletal muscle, which arguably we don't have a great way to look at. You do not go routinely to your physician, and they check your skeletal muscle health. They don't. And one could ask, "Well, how would you do that?" People are not going to do a CT or MRI to look at if there is fat infiltration into skeletal muscle, which is what happens. And then people will say, "Well, you can be obese and have higher amounts of muscle." We're not talking about the amount of muscle, talking about the health capacity of skeletal muscle. It is a under-appreciated organ, it is responsible for metabolic control, large... 80% of glucose disposal is skeletal muscle. If you destroy skeletal muscle, where is the glucose going to go?

SHAWN STEVENSON: Ooh. I really hope people get that. That's so powerful. So powerful.

DR. GABRIELLE LYON: And if there is a lack of flux utilizing glycogen, utilizing fatty acids, what are you going to do with that substrate? It's going to build up. That tissue is not going to be healthy, and I believe this is the root of disease.

SHAWN STEVENSON: Yeah. It's literally going to tear us down from the inside out if we're lacking muscle.

DR. GABRIELLE LYON: Yeah. Yeah.

SHAWN STEVENSON: Wow. That's so powerful. You mentioned earlier about this... There's this kind of break between fitness, the "fitness industry" and medicine, right? But the thing that bridges them immediately that is just totally missed is the fact that muscle... In the fitness industry, muscle is an endocrine organ, right?

DR. GABRIELLE LYON: Yeah. Yeah.

SHAWN STEVENSON: So... When we're talking about an endocrine organ, we're talking about an organ that produces hormones of their own and also associates with hormones. And so if we're talking about hormones, we're talking about these chemical messengers that essentially tell all your cells what to do all the time...

DR. GABRIELLE LYON: Exactly.

SHAWN STEVENSON: And this is an endocrine organ, again, that we can directly influence... So powerful.

DR. GABRIELLE LYON: Isn't that incredible? Just... If we can take a step back in a moment, we have direct control over the largest endocrine organ in our body. You can contract it and just like you said, it secretes its own chemical messengers. Interleukin 6 is the most well studied. There are hundreds of different myokines which is what contracting skeletal muscle produces, and they do numerous things throughout the body, whether it's Interleukin 6, Interleukin 10. I mean, they have a multitude of effects, and that's really what makes skeletal muscle an endocrine organ. It's incredible. And there's something I want to say here, I'm just dying to tell you this.

SHAWN STEVENSON: Okay.

DR. GABRIELLE LYON: So, Patterson in 2003, she was really the one who paved the way. She is an exercise physiologist and an immunologist. She, I believe, is in Copenhagen right now, has a long-distinguished career. And looking at contracting skeletal muscle producing these myokines and Interleukin 6, and this is really for the listener, there's a lot of discussion in terms of exercise and what exercise does and how it utilizes calories, substrates, but what's so fascinating is, skeletal muscle secretes Interleukin 6 one way that determines the amount is in a low glycogen state. What does that mean? There's a lot of controversy about fasted training, and some of the evidence would suggest, well again, does it improve performance? Does it improve, again, these performance markers where I think the fitness industry really focuses?

From my perspective, I'm very interested in disease prevention, so I don't care so much about performance markers, I'm interested in health markers, and training in a low glycogen state can have more robust benefits for releasing Interleukin 6. And that is just a great take-away because I know in terms of the fitness industry, they say it doesn't really matter.

SHAWN STEVENSON: So, can you dig in a little bit deeper about what kind of benefits that would give folks?

DR. GABRIELLE LYON: Yeah. So training, according to some of the data from Patterson's lab, training in a low glycogen state with this increase in Interleukin 6 can actually help direct substrate utilization, or fat oxidation, lipid oxidation, carbohydrate consumption. It can also interface and have anti-inflammatory effects. The exercise that you do has very close to a direct relation to the amount of Interleukin 6 released. You can augment that by training in a low glycogen state. These are just little things for individuals who are perhaps not going to do endurance training. A lot of the research is based on endurance training when it comes to myokines. There is some resistance training data out there. The most recent one I read was... I think that they were looking at increase in Interleukin 6. Something very simple, 12 reps at... I think it was 65% of one rep max. Either way you cut it, whether you are doing endurance or resistant training, not only are you utilizing substrate within the muscle, but you're also secreting myokines, which allow muscle to function as an endocrine organ. This is deep stuff.

SHAWN STEVENSON: Yeah. Yes. This is something that is very counterculture to what I was taught, what you were taught.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: This kind of very overarching beliefs about like, you got to make sure you fuel your workout, right? And so, I literally remember the first day I went to the gym in a fasted state. It was a gold gym in Florissant, Missouri... St. Louis...

DR. GABRIELLE LYON: Yeah, yeah, yeah of course.

SHAWN STEVENSON: And, you know, it was there, just open, it was nice. I was going there for a little while. And then I was just kind of having some conversations with some experts, and so I went to the gym to do my workout. I think I might've had some yerba mate tea or something like that.

DR. GABRIELLE LYON: Which I love by the way.

SHAWN STEVENSON: Shout to yerba mate, alright.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: And I went there, and I did my workout, and I was fine. And I couldn't... The thing was, I had never lifted weights without having something prior to. And I got to be honest, I did feel a little bit less kind of strength output but that was just about it. I was fine. I would have thought that I'd be just dragging and just everything would be so difficult, and my blood sugar would be so low that I'm like...

DR. GABRIELLE LYON: Right.

SHAWN STEVENSON: Maybe feeling dizzy and all these things and... These things can happen though, by the way.

DR. GABRIELLE LYON: Absolutely, and again we're not talking about performance, and this is where...

SHAWN STEVENSON: Right, that's the thing.

DR. GABRIELLE LYON: A huge interface of this... Shawn, this is where we have to really bridge the gap is that, when you are training for performance it's very different. We are also talking about individuals who are perhaps insulin resistant or obese. Can we really think about prescriptive type medicine in meaningful ways that we can measure? I don't think we're there. I mean, the way in which we measure it... Obviously we'll look at triglycerides which are impacted from training, same with HDL. But the reality is, can we reframe the conversation? Again, if someone goes trains fasted and they're increasing their Interleukin 6, is that more beneficial than if they ate and trained? Not necessarily. But the big overarching theme is that perhaps there's so much more to the story and there's so much more to the interface of skeletal muscle than we're giving it credit for.

SHAWN STEVENSON: Yeah, this should be based on your goals, right? Because... Thank you for bringing that up because, for me I was paying attention specifically to performance, which is very different from getting this therapeutic benefit which...

DR. GABRIELLE LYON: Right.

SHAWN STEVENSON: Again, maybe there's a patient coming into a muscle doc, you know, like yourself, who is just like... They're insulin-resistant, they're wanting to... They've got maybe 50

pounds to lose, and maybe they're in the early stages of cardiovascular disease, and the prescription for helping to get their insulin sensitivity up...

DR. GABRIELLE LYON: Exactly.

SHAWN STEVENSON: Or reducing the risk factors is to... First thing in the morning, they've got a 20-minute strength training session where they do...

DR. GABRIELLE LYON: I love it. Love it.

SHAWN STEVENSON: Sort of push pull, leg press or something like that. Just maybe three sets of each thing. They're not looking at these huge performance markers, they're just engaging their muscles for these benefits.

DR. GABRIELLE LYON: Right. Yeah.

SHAWN STEVENSON: And this is going to very likely have a great impact on their biomarkers.

DR. GABRIELLE LYON: Absolutely, and then the other thing is... The question is how much effort does someone... No, I'm an individual who believes in effort. Effort determines outcome. However, if individuals are starting, there are studies that suggest that three bouts of 15 minutes of a stair mill a week can actually improve insulin sensitivity. And this is not crazy but meaningful, especially in the face of disease. Which is really what we're all... Or even in the face of longevity, which is what everyone is talking about.

SHAWN STEVENSON: Yeah, a big part of this longevity conversation is mTOR.

DR. GABRIELLE LYON: I know, yes.

SHAWN STEVENSON: So, let's talk about what mTOR is and also the controversy around...

DR. GABRIELLE LYON: Yeah, can't wait.

SHAWN STEVENSON: Protein with this.

DR. GABRIELLE LYON: Yeah. I would say that, again, the narrative about longevity is to reduce dietary protein, and reduce dietary protein midlife. Midlife is really the time where you need to be training. I mean arguably, you always need to be training. Nonetheless, really ramping it up and putting on that body armor which you love so much is essential. It does not get easier. There is a propensity for skeletal muscle insulin resistance, the ability to utilize glucose.

Skeletal muscle as it ages becomes less efficient at recognizing protein, which is part of the mTOR story that we're going to talk about. And so, with the longevity conversation, the idea of, number one, reducing diet... So, I want to just put that out there. Number one, the idea of reducing dietary protein to protect against longevity is essentially saying muscle doesn't matter. But we know that skeletal muscle improves all survivability, and by the way, anyone who has ever worked in a nursing home will tell you how important muscle is. I was reading this morning... You know, I was re-reading one of my favorite papers, and with a female who perhaps isn't the healthiest falls and breaks a hip, she has a 50% chance of never walking again.

SHAWN STEVENSON: Wow. That's nuts.

DR. GABRIELLE LYON: I mean that is insane. Do you understand that trickle-down impact that's going to have on her family? On herself? On her well-being? Everything. So again, when we are talking about longevity and mTOR, we must phrase it in real-life application. Skeletal muscle, nobody can argue requires dietary protein. This is a non-arguable fact. Whether you get your dietary protein from plants versus animals, one is obviously easier, the other is more difficult. Can it be done? It can absolutely be done. I will set the stage to tell you that the RDA, which we have known has not changed over the last 40 years as it relates to protein, is 50% too low to maintain health and wellness. So, the RDA, and I'm setting this up for a very specific reason, the RDA is set at 0.8 grams per kilogram, based on nitrogen studies of 18-year-old men that was extrapolated from animal data that we know, and in the literature, there is not one study that doesn't show improvement and end points whether it's body composition or biomarkers of nearly double that. Higher protein always does better than baseline RDA, okay? We have not changed that recommendation in the last 40 years. You mean to tell me that there has been no increase in knowledge of dietary protein in the last 30 to 40 years?

That's not true. So, we have to ask why is that not being addressed? So, the literature clearly supports double the RDA for overall survivability, especially as it relates to an aging population. Meaning closer to 1.8, 1.6 grams per kilogram. Now, now I'm bringing this back to longevity and mTOR. The longevity experts are recommending 0.3 grams per kilogram. That is nearly 50% lower than the RDA. I don't see how that is responsible. I think the unintended consequences of this narrative, we are going to see epidemics of sarcopenia, which is, you know, sarcopenia, dynapenia. Sarcopenia is loss of skeletal muscle mass. Dynapenia, loss of strength. We are going to see epidemics of this and osteoporosis like we've never seen in the next decade. So, the original question is, how do we address mTOR? The reason I say this is because mTOR is in every tissue in the body. It's mechanistic Target of Rapamycin. It's a protein kinase. We have preserved its use since the beginning of time, which means it's important. mTOR in skeletal muscle is exquisitely sensitive to dietary protein. Meaning, it requires a very particular amino acid to stimulate mTOR, okay? That is leucine. Leucine is one of the essential amino acids.

It's one of the branch of amino acids. Now, are you with me? Okay. As we get older, the tissue becomes less sensitive to the dietary protein we eat, so we actually need double the amount of protein to stimulate mTOR to help maintain healthy skeletal muscle. You either stimulate it or you don't. Now, you're like, "Well, what is that dose?" The minimum amount of dietary protein required to stimulate mechanistic Target of Rapamycin based on leucine and high-quality protein is 2.5 grams of leucine. Which means the minimum is 30 grams of dietary protein to stimulate mTOR, the bare minimum. As you age, your tissue becomes anabolically resistant, meaning you cannot stimulate it the way that you did when you were younger. So, you need between probably closer to 50 grams to stimulate muscle protein synthesis. We are talking about survivability, longevity, activities of daily living, body composition, protection against insulin resistance. How are you going to do that on a low protein diet if you do not have optimal muscle mass? It is not going to happen. It does not get easier to protect skeletal muscle, it does not get stimulated. So, the recommendation that we've seen is 1.6 grams per kilogram, 1 gram of protein per pound ideal body weight.

When individuals are aging, they need more protein not less because of the mechanistic Target of Rapamycin being less efficient at recognizing dietary protein. So, it's kind of like, either start the car or you didn't.

SHAWN STEVENSON: So, what about the theory around improving the sensitivity of mTOR by fasting from protein?

DR. GABRIELLE LYON: How does that... I mean, I get the theory, but how does that make any sense? There are so many other ways if you want to dampen mTOR. First of all, exercise also stimulates mTOR. Exercise, protein. And again, we're just talking about skeletal muscle. People are talking about reducing mTOR expression. There's mTOR in liver, in the pancreas, in the brain. They are much more sensitive to excess calories and carbohydrates and insulin, yet we don't talk about that. So, if you're not eating dietary protein, what's the recommendation? Eat more carbohydrates? But if I just told you that the liver and the pancreas, that the mTOR signaling is much more sensitive to excess carbohydrates, then how does that make any sense? It doesn't make any sense. So, we must question where is this narrative coming from and who stands to profit, because it doesn't make sense. As a geriatrician, no one would say, "Reduce your dietary protein." No geriatrician would say that.

SHAWN STEVENSON: Wow. Thank you for bringing this up because it... This is something that a lot of people do realize, especially if you're more health-minded, but it can go on the back burner of like, who's profiting from the recommendations, because somebody is, because you mentioned the dietary guidelines for protein not changing in 40 years.

DR. GABRIELLE LYON: How is that possible?

SHAWN STEVENSON: There's this blanket idea that Americans are eating too much protein and it's killing us.

DR. GABRIELLE LYON: Right. In what world? But where's evidence to suggest that? Meat consumption is down. Our carbohydrate consumption is 300 grams a day, easy. Dietary protein is essential.

SHAWN STEVENSON: So, our protein consumption is actually down, counter to popular belief, but our carbohydrate consumption is through the roof.

DR. GABRIELLE LYON: It's through the roof. We're eating more processed foods; we're eating more calories. And I hate to demonize a macronutrient, but the conversation around restriction of dietary protein because it's going to improve longevity, I think is very shortsighted. How about we do it in other ways like reduce total calories? And if you really want to do protein restriction, which perhaps there can be some benefits, maybe do it one... A few days every three months. We have to really be conscientious in terms of... And listen, if you're going to do it during those times, you should be training. The other way to stimulate skeletal muscle is through resistance training. However, we cannot dismiss the fact that the sensitivity of skeletal muscle tissue decreases as we age. And even in obesity, there's a blunted muscle protein synthesis response. To me, that means a higher amount of dietary protein at one time. So, while we're arguing about what it's going to look like at the end of life, if someone is sarcopenic, falls and breaks a hip and never walks again, but she lives an extra six weeks, I bet if you asked her, she would say I wish I would've done it different. The reason I say this is because I've seen it.

SHAWN STEVENSON: Yeah. Yeah.

DR. GABRIELLE LYON: And that is powerful when you bridge the gap of evidence-based practice to what you actually see at end of life. So, in terms of dietary protein... And there's also going to be a paper coming out by Stu Phillips that... Where all this came from was a 2014 paper that was published in Cell. And Levine was the first author, and they are very fine scientists out of Yale. Levine published this paper that said something about protein and cancer. It was like, I don't remember the title, Protein, IGF-1 and Cancer. And Cell was a new journal at the time and is not a nutrition-based journal. So, what happened was they used mechanistic data, took NHANES data, broke it down, somehow extrapolated some of these populations, and then put it together and had it published. And it really is going to take decades to undo. But there were multiple groups of scientists, and also, there was a letter to the editor written that was never published, because one of the authors was actually on the paper, one of the editors of Cell was

on the paper. It was never published about how the statistics, how the mechanistic data plus taking together this NHANES data didn't support the claims that they were trying to make.

And so, these other groups had status... And in fact, they said, Listen, the unintended consequences of telling people to reduce protein below the RDA is going to be devastating for the population. And there will be a paper that is in the process of trying to be published appropriately that actually shows no correlation between cancer and dietary protein. I can't wait for that paper to come out.

SHAWN STEVENSON: Wow. Just...

DR. GABRIELLE LYON: You got me all pumped up. I'm sorry.

SHAWN STEVENSON: No, no, this is... Yes.

DR. GABRIELLE LYON: But it's so important. And it's scary because evidence... Peer review... We have to look at the body of evidence. The body of evidence supports dietary protein for numerous health protective benefits. And now, all of a sudden, we're having mechanistic data or rodent models or C elegans saying we should reduce dietary protein. That is going to be a huge mistake to the general population.

SHAWN STEVENSON: I even sent you a paper the other day, and this was published in the Journal of Circulation. And the title of this study is Skeletal Muscle Abnormalities and Iron Deficiency in Chronic Heart Failure.

DR. GABRIELLE LYON: Right. Yeah. And we know that those individuals, they really struggle to even maintain healthy skeletal muscle. And even those with iron deficient, they struggle even more. There's no doubt. There was a study I sent you, there's a lot of discussion about how individuals should reduce dietary protein because they're afraid of the insulin effect. And really, there is a phase one insulin release, but it's nothing compared to carbohydrates. Gram per gram, it... And I think logically, we all know that. So, again, dietary protein in this discussion of longevity, we have to be very careful about what we're talking about. MTOR is stimulated in numerous tissues in numerous ways. The idea that we would target skeletal muscle and protein restriction to me tells me this is an old narrative, a perhaps old agenda packaged in some new way. So perhaps, I'm just going to put that out there.

SHAWN STEVENSON: For me, I love the fact that, number one, you have real world experience in seeing what the aging population, what it looks like when we're lacking contribution to muscle and when we're living in a sedentary lifestyle. You've seen it. For me, I'm a very big results-oriented human being. Sometimes just the ability to step back and look at the results,

look at what's actually happening, and you can see it, it's not very hard to see, as a society, we are the sickest nation in the history of humanity.

DR. GABRIELLE LYON: And we're unconscious about it.

SHAWN STEVENSON: Yeah. That's the thing. Exactly. We're unconscious about it because it's become normalized.

DR. GABRIELLE LYON: It is normal.

SHAWN STEVENSON: Where being healthy is abnormal.

DR. GABRIELLE LYON: And we have two huge groups. Right now, we have the sedentary population, obese population, and then we've got super fit people. It seems as if there is a very drastic split. And if we can come together and understand that there should be an interface, we'd be in much better shape, no pun intended.

SHAWN STEVENSON: Yeah. Oh, I like that. But it's just... It really is... It's cultural conditioning. We've seen this devolution, really, take place, even from elementary in just having recess and being active and the physical fitness and all the things. We've got categories of people who are proactively engaging in these things and putting their kids in all these things, but so much of activity has just been dwindling away from our childhood experience and much more time sitting in desk, sitting on devices.

DR. GABRIELLE LYON: iPhone. Yes.

SHAWN STEVENSON: Staring and not actually engaging in the real world, right?

DR. GABRIELLE LYON: Mm-hmm.

SHAWN STEVENSON: And also, again, I can understand we might have an adjustment period, but you've got to look at who's profiting from this behavior.

DR. GABRIELLE LYON: Exactly.

SHAWN STEVENSON: And so, this is becoming something that kids are born into now. And with that said, again, we are the sickest nation, the most chronically diseased nation in the history of humanity, yet the guidelines that we're promoted about what to do, so many people follow those guidelines, and it hasn't worked. So, again, looking at the results of people reducing their protein intake, and also, you mentioned too, the majority of data that we have around exercise

is done on cardiovascular aerobic-type exercise. Why has that been so heavily promoted, and so little attention paid to strength training and resistance training?

DR. GABRIELLE LYON: Yeah. I don't know. So, when I was at the lab in Wash U with Halla Z, he was the... He's one of the godfathers of exercise. And I think it was just... He would just talk about it just as a the matter of the time. That was the kind of training that they did. Right now, they're definitely increasing the amount of studies, but in women, there's very little resistance training studies in women. Again, these are... This is... Nutrition in and of itself is a newer science and exercise physiology and that interface, we're just scratching the surface.

SHAWN STEVENSON: Yeah. Like you said, it's changing now. There's a bunch of studies around resistance training going on as we speak, which is awesome.

DR. GABRIELLE LYON: Incredible.

SHAWN STEVENSON: But why take so long, decades for this to get to this place where, again, we have these very superficial things. You got to get out here and jog or run on a treadmill, be in this aerobic zone for a 100 plus 120. Was it 150 minutes a week, or whatever the case might be.

DR. GABRIELLE LYON: Yup. And it's going to take decades to reach the population.

SHAWN STEVENSON: Right. Exactly.

DR. GABRIELLE LYON: The information that we're going to see where they're going to prescribe four minutes of some kind of high intensity exercise a week to improve insulin sensitivity because it improves GLUT4 transportation of glucose into the cell. They're not even going to recommend that yet. But that's going to be in another decade where they're going to say, "Listen, we know that you need to be doing some kind of high intensity interval. We know that you need to be looking at some kind of real intense strength training and that it has to be effortful." And eventually we're going to look at skeletal muscle mass index, which I look at in my clinic, but that is not the norm of being able to look at how much muscle mass should someone have. Again, we don't necessarily know. We know how much you shouldn't have for disease and sarcopenia. But I can't tell you what your optimal muscle mass is. And this is a real oversight. So, what can we do? Obviously, we can look to people that are at least highlighting some of the literature, highlighting some of the evidence, but in terms of the guidelines, I'm not sure we can count on them. We're talking about... They're still arguing about... Listen, cholesterol was taken out of the guidelines in what? I don't know... Was it 2010, they took cholesterol out? Maybe 2015? But we're still hearing about how dietary cholesterol is a problem. How's that possible?

SHAWN STEVENSON: Yeah. Good and bad. And again, there are very brilliant people, scientists, physicians...

DR. GABRIELLE LYON: Brilliant, brilliant people.

SHAWN STEVENSON: Who are still throwing that label as bad cholesterol. Your body literally... If you don't have LDL cholesterol, you die. It plays a critical role. Now, of course, we can look at biomarkers and seeing when things... The ratios are abnormal. Absolutely. But just labeling these things so black and white is part of the problem. When we have this immaculate, complex, brilliant system where everything plays a role, and so... But again, it makes it easy. It makes it easy to say, "That's bad cholesterol, so don't do this thing."

DR. GABRIELLE LYON: And maybe there's an interface with the statin industry, that's a, what...

SHAWN STEVENSON: Of course.

DR. GABRIELLE LYON: A 40... What is it? 40 million people are on statins? Enough.

SHAWN STEVENSON: It's a multi, multi-billion-dollar industry.

DR. GABRIELLE LYON: So maybe... Right? So, what...

SHAWN STEVENSON: It's their big cash cow, still.

DR. GABRIELLE LYON: And then we ask, well, who funds these guidelines? How does that even work? And I think it becomes very distorted. I was really disappointed, and I'm not going to mention names, but I was looking at... So, there's the National Academy of Science that... The way in which recommendations are made, there's policy and there's scientists. And there's the World Health Organization. People are trying to make recommendations globally. And there are certain individuals that are in very high positions in academia that have incredibly strong beliefs. Now, notice I didn't say science. I said very strong conviction beliefs. And I was looking at the National Academy of Science, which then kind of influences the policy, which then influences my children, schools, and it influences the military, which we're a military family. And then all my patient population that are operators. It's huge. And my point is, I was looking at the lecture and who the lecturers were, and one of the lecturers is an absolute known zealot. And I'm like, "We don't even have a chance." There is no chance. So, I think that we, as consumers and as lay public, I believe that the public can understand science. I believe that they can do it.

SHAWN STEVENSON: Absolutely. It's just in how it's taught.

DR. GABRIELLE LYON: I believe that they can understand. And I don't think that we should impose outdated views or make it so that they don't understand kind of the policy behind where this is coming from. There has to be more transparency, which is what I suppose, in effort, that's what I'm trying to bring to this conversation, is real transparency.

SHAWN STEVENSON: I've heard this many times behind the scenes, whether it's with publishers, whether it's with academics, but dumb it down. Dumb it down. It's such a disrespectful concept, because the reality is, we're brilliant. And it's never the thing, it's how we're taught. It's how... And also understand that people learn differently. And I love this quote from my friend Jim Kwik, he says that it's not how smart you are, it's how you're smart. And understanding that we all have different capacities and different... Some people are more visual, some people are more auditory. But being able to create education that honors the fact that we all learn differently instead of, again, you got to be good at this one superficial way, this rote memorization, and then you can be successful in academics. And also, there's a big missing component with education, which is critical thinking, and the ability...

DR. GABRIELLE LYON: I think that that's arguably missing overall.

SHAWN STEVENSON: Yes, absolutely. But just, we're... Again, we're told what to think, we're told what to believe, and if you don't believe this thing, then you're not going to get the grade, you're not going to pass, you're going to get problems.

DR. GABRIELLE LYON: We are told... We are not taught to learn and think. We are taught what to know. And I think that you have to question everything.

SHAWN STEVENSON: Yes.

DR. GABRIELLE LYON: I didn't come to this conclusion that muscle is the focal point 'cause I was taught it. I feel like I failed... When I was in fellowship, I feel like I failed people. And we as a medical society, we're failing people. And I just... I couldn't imagine listening to these stories of these patients over and over again, trying to fix the same problem. If obesity was the problem, we would have fixed it. If we were doing it right, we would've fixed that thing four decades ago. We're not looking at the wrong... We're trying to solve for the wrong problem. Problem isn't obesity. The problem is that it's a muscle crisis. It's not an obesity crisis. I mean, yes, of course, it's an obesity crisis, but come one, if we want to talk about root cause, that's just the periphery. And so, this came from what I felt as if we had failed.

SHAWN STEVENSON: Again, look at the results. We've got, again, multi, multi-billion-dollar statin industry. Got a huge percentage of the population on statins. But we're still dying from heart disease. It's the number one killer, still.

DR. GABRIELLE LYON: You know how you can help heart disease? Skeletal muscle. You care about lipids; skeletal muscle can impact the production of lipids in the liver.

SHAWN STEVENSON: Yeah. We're trying to treat target... And this is the other thing too, and I do my best to talk about this whenever possible, but we're trying to target this isolated thing in the human body as if everything else doesn't talk to everything else.

DR. GABRIELLE LYON: It's all interconnected. Yeah.

SHAWN STEVENSON: So, if we're targeting, trying to superficially or artificially press down LDL cholesterol with this targeted thing, what does that do to the function of your pancreas, what does that do to the function of your liver, what does that do to the function of your brain? And so, what are some of the things we're seeing in the data now? And we'll put the study up for people to see. About a 30% increased incidence of developing diabetes when you're on a statin. Are patients even getting educated about that?

DR. GABRIELLE LYON: No. And statin has skeletal muscle implications. Skeletal muscle is a major regulator for glucose, for glucose disposal.

SHAWN STEVENSON: And it's another question about why is the body creating a ratio that seems to be... By the way, that ratio, the LDL numbers just keep getting pushed down lower and lower and lower to what is acceptable as "healthy." That number keeps getting pushed down, which automatically bumps up another 10%, 15%, 20% of the population who needs to be on a statin, just automatically, are you... Even as a protective thing, because another little not so fun fact is that somewhere in the ballpark of about 50% of the people who have a heart attack, don't have high cholesterol, from those standards, which again, they keep pushing the standards down to make it fit this narrative and not to... This is the thing too. Not to say that there isn't a place for this...

DR. GABRIELLE LYON: Absolutely.

SHAWN STEVENSON: But when this becomes the norm, when this becomes the go-to treatment that is yielding such poor results, as smart as we're supposed to be, we have to at some point say, "This isn't working, this isn't appropriate." But then we get in the conversation of what actually does work, which is getting to this conversation something that our DNA expects. We have this capacity to build muscle...

DR. GABRIELLE LYON: And it's pliable, we can do it. Can't think your liver bigger, can't think your kidney bigger, but you can actually train and put on tissue. That is mind-blowing to me. That is protective body armor, like suit up. Incredible. It's incredible, and underrated and under-appreciated.

SHAWN STEVENSON: There's that's crazy muscles under-rated out here, that is crazy. Should be in your top five emcee's. We've got a quick break coming up, we'll be right back. It's no secret that processed food manufacturers have a team of scientists chemically constructing Frankenfoods that are incredibly addictive, but also causative agents of degeneration and disease. It's one thing to tell yourself to stop eating these processed foods, it's another thing to our biology that can actually become addicted to some of these chemical and sweet elements. Well, researchers have recently discovered that there is a natural food element that's able to help our brains and our biology resist the urge to eat hyper-palatable, fake processed foods. A study published in the peer review journal, Appetite, found the that chlorophyll can actually aid in weight loss and reduce the urge to eat hyper-palatable foods.

Now what's really interesting is that it was also found to increase the release of glucagon-like peptide-1, which according to research published in the Journal of Endocrinology has a potential to trigger body fat redistribution. This means that it's sparking the release of visceral aka belly fat and increasing the ratio of subcutaneous fat, which appears to be more protective against metabolic diseases, pretty cool stuff, found in chlorophyll, one of the most chlorophyll-dense foods that you can find, well, anything green is going to have chlorophyll. It's an indicator of the chlorophyll content, but specific foods like chlorella, getting its name from chlorophyll, is really taking things to another level. Chlorella is actually 50% protein by weight, it's a complete protein, one of the most protein-dense nutrient sources ever discovered. It also contains carotenoids like Lutein and zeaxanthin that have been found to protect our vision from things like macular degeneration. And to top it off, a double-blind placebo-controlled study published in clinical and experimental hypertension found that chlorella was able to significantly reduce blood pressure of test subjects with hypertension by the end of the 12-week study period.

So being an actual source of treatment for people experiencing hypertension, something remarkable about it, chlorella combines that with spirulina, another nutrient-dense super algae, which is 71% protein by weight, and spirulina of course, is also another remarkable source of chlorophyll along with being rich in B-vitamins, in copper, in iron, the list goes on and on in the micronutrient ratios. I get them combined together with other powerful super foods and in the organifi juice formula. Go to organifi.com/model, that's O-R-G-A-N-I-F-I.com/model, and you get 20% off their incredible green juice blend, their red juice blend is amazing as well. My kids love it. Their gold is remarkable, just everything that they carry. They're doing things

the right way, organic, low temperature processed, to help to retain the nutrients and they taste fantastic. Go to organifi.com/model for 20% off. Now, back to the show.

Alright, I want to ask you about just some general practice, and again, I know that it's the ultimate place to get to is paying attention to your unique metabolic needs, your unique expression of muscle and what that right balance is, but I want to ask you some general practice advice for, if we're going to be strength training to build muscle, for example. I think that we can run into a couple of different barriers. One of those being maybe even intensity, like how much do we need to engage in a resistance training practice to actually get maximum benefits? Or not even maximum benefits, but...

DR. GABRIELLE LYON: Some benefits.

SHAWN STEVENSON: Therapeutic benefits.

DR. GABRIELLE LYON: Yeah, yeah. I think it's a great question. Well, number one, effort determines outcome, and there has been studies in terms of, when I mean effort determines outcomes, we're talking about how heavy do you have to go? And Stu Phillips, who is a great friend and a great researcher, he would argue that as long as you're going to perceived exertion and you're doing volume, so volume is really important in terms of what I think about as it relates to medical impact. We're talking about hypertrophy, that you don't have to go to heavy weights and do maybe four reps, but it really is about the volume of... For your women listening, maybe they're like, they don't want to lift heavy weights, so it's actually about going to perceived exertion. I recommend training actually four to five days a week with resistance training. And I think you can, if you're creative, you can split it however you want, as long as you're moving all those body parts. Hypertrophy is pretty easy and a no-brainer kind of training in terms of are you working each muscle group twice a week, I think would be perfectly acceptable. And then also, there's a split between hypertrophy, which is, again, resistance training, and then cardiovascular activity, I think both are really important. I think building a foundation of cardiovascular activity, which is even lower-level training, it helps with mitochondrial biogenesis, helps with fat oxidation, helps with overall muscle health.

SHAWN STEVENSON: Yeah. We had... I'm going to say arguably, but for me, it's really no argument, the top trainer, he's the guy that the other guys want to be, to be like. He's been doing this so long, Gunnar Peterson, and for so long, he's been the go-to guy for Hollywood, for these big blockbuster movies, for celebrities, and then of course everyday folks as well. And so he's kind of like the template, and he was sharing this really interesting thing, because I was trying to dig in, "What are your secrets? What do you tend to do with your people, getting them magazine-ready or screen-ready, whatever the case might be." Part of the reason he's been so successful is he still... He's honored functionality for so long too.

DR. GABRIELLE LYON: I love that.

SHAWN STEVENSON: But also, circuit training, so getting this...

DR. GABRIELLE LYON: Yeah, resistance exercise.

SHAWN STEVENSON: Strength training input, while engaging more of a kind of a cardiovascular lean, it doesn't have to be this like, this or that. We can engage and get both done.

DR. GABRIELLE LYON: I think that's phenomenal. So doing a high energy output, because high-intensity interval training or that fast kind of training, I mean, is valuable.

SHAWN STEVENSON: Yeah, so just to throw out a circuit example, so this could mean maybe you do a chest press, then you go immediately to a lat pulldown, lateral pulldown, and then you jump rope for a minute, right? And maybe you rest for 30 seconds and repeat that circuit, or maybe there's five exercises like, of course, you want to get some intelligent framing of it.

DR. GABRIELLE LYON: But that's incredibly effective. It's incredibly effective, 'cause now you're getting resistance training and cardiovascular activity, and I'm sure if an individual is weight loss resistant, he... Weight loss resistant, he would probably put them to do, I don't know, maybe a little more cardio.

SHAWN STEVENSON: So, this is... I love it, I love that you said that we're essentially, we're going to get out what we put in, it's very... Again, it should be very logical, but you also mentioned hypertrophy, so we're looking at this... It's so crazy that this comes from a fitness sphere versus medicine, which is time under tension.

DR. GABRIELLE LYON: Yeah. Do you know that I believe that the fitness people really have it right?

SHAWN STEVENSON: Yeah.

DR. GABRIELLE LYON: If we really want to make a... And I'm a trained physician, I'm not a fitness professional. I think that the magic lies with the fitness professionals, because of the stimulus and input that the capacity to change the physiology is so much more significant with exercise than with anything else.

SHAWN STEVENSON: Yeah, yeah, I love it. And again, there's a place for all of these different inputs, the power lifting, the strength training, but specifically in that lane of hypertrophy.

DR. GABRIELLE LYON: And that's easy, right? So, if someone is untrained, they are very quick to put on muscle...

SHAWN STEVENSON: That's that they're the benefit, that's that new guy, new girl...

DR. GABRIELLE LYON: Yeah, yeah, yeah. And women can actually put on... I was talking to Allan Aragon about this yesterday, and men are... And I... A well-trained man, or a man who is training up, he could put on one to two pounds a month of skeletal muscle. So, let's say someone is intermediate really starting to train doing everything right, that's 24 pounds of muscle. 12-24, versus for females, roughly half that. Though it can be done, but everything... And hypertrophy training is pretty straightforward, although it does require a bit of a calorie surplus, maybe 10%-20%, nothing crazy, obviously, you optimize for dietary protein, carbohydrates, and fats, whatever you want, as long as you're hitting that calorie need.

SHAWN STEVENSON: I want to ask you about the protein fueling around this equation, but first really quickly, so the rep range here would be maybe 8-20 depending on...

DR. GABRIELLE LYON: It depends. Totally.

SHAWN STEVENSON: So, time under tension, but we want to get to that place where you're really feeling that the tension, the stressing of the muscles so...

DR. GABRIELLE LYON: The mind connection.

SHAWN STEVENSON: If you got the two little two-pound dumbbells it that might not get you there, maybe could do a thousand reps with those things, so something that is challenging, but also putting time under tension for that hypertrophy.

DR. GABRIELLE LYON: And that would be the amount of sets that you would do would obviously vary depending on your training status, whether it's 10-20, it depends.

SHAWN STEVENSON: So, if we're going into the workout... So, you mentioned fasting exercise, so that's one possibility, but there's also a school of thought where we maybe do a little bit of protein before working out, like a whey protein, something quickly digestible and work out. So, I want to ask you about pre-workout nutrition, and then we'll talk about post.

DR. GABRIELLE LYON: So, I would say that if you are a generally fit human, you probably don't need protein before you train, and the International Society for Sports Nutrition wrote a great position paper. I'll send it to you so you can link it for the crew, but it doesn't really matter, the 24-hour dietary protein intake is going to be most important, let's say if you're just a routine fitness person. I'm going to tell you where I think it matters, and that is with an aging population or someone who is obese and may have impaired muscle protein synthesis. And those people, I personally believe, post-training benefit the most from getting the protein in, and people will say, "Ah, there's no such thing as an anabolic window." And I would say, "Listen, for aging populations..." And there are some problems with the studies, I understand, maybe they don't talk about what these people ate otherwise, but I would say, "There is evidence to suggest that post-protein feeding, if an individual is older or if they are obese, they could benefit." Because it helps, there's blood flow to the muscle, it helps overcome that anabolic resistance, muscle is stimulated, and now you're adding dietary protein, and then the next thing is, why not? Like why would we not do that? But for the rest of the population, I would say I wouldn't worry about it too much, as long as they're hitting their 24-hour protein goals, their daily protein goals.

SHAWN STEVENSON: Okay. So now what if we just want to have something?

DR. GABRIELLE LYON: Great. No problem.

SHAWN STEVENSON: So, would that be a banana, or would that be a hard-boiled egg or would that be a whey protein shake?

DR. GABRIELLE LYON: So, it would depend on what the goal is. So, we know if someone is going to be doing more endurance type activities then more carbohydrates for that person may be better, again, it really depends on the output and what their goals are, and also what are they eating for the rest of the day. I think that it really just depends on that individual, me I train fasted.

SHAWN STEVENSON: Yeah. What if... Well, by the way, there's been times talking about muscle I've been wanting to just drop down and do some pushups, if get these benefits...

DR. GABRIELLE LYON: We'll do that after. We're going to do a push-up challenge after.

SHAWN STEVENSON: Oh, for sure, oh, let's go.

DR. GABRIELLE LYON: I'm definitely losing that one.

SHAWN STEVENSON: Well. I don't know. So, it's just, if for example, we do a workout, so we get into the afternoon, we're just hanging out, maybe it's three, four o'clock now, and maybe you had something earlier, but it's just like I am... Need to put a little something in the tank, if that is a situation for somebody, for example, what would you do if you knew like, "Okay, I really haven't had anything yet today and still my workout is an hour from now." What would you do?

DR. GABRIELLE LYON: I would say utilize the carbohydrates around pre- and post-workout, rather than just sitting around, this way, you're augmenting glucose disposal. Typically, that's how I do it for my patients, we put their carbohydrates around their workout, before and after. Now, I will say though, we do keep it under 40 grams or less of carbohydrates, and then anything above that would be associated with muscle recovery or glycogen replenishing. They have to earn it, or if they're doing some kind of endurance or activity.

SHAWN STEVENSON: So, what about post-workout protein?

DR. GABRIELLE LYON: Yeah, I think it's great. I think it's great, again, but the data would suggest if you're a healthy individual, you could do it any time, but I would say, why? Why not create those habits?

SHAWN STEVENSON: Yeah. I keep trying to pull your arm here to like... Which, and just, again, which, again, is the obvious answer. As long as it's within that day...

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: Within that construct of...

DR. GABRIELLE LYON: Yeah. But if you're older, I disagree with what people are talking about, that it doesn't matter. If individuals are older, they have anabolically resistant tissue. Ways in which we can overcome that decrease efficiency of dietary protein, if we care about longevity, we care about mTOR, then I think we have to have some consistency about the way in which we're thinking about it. And I would say we've now primed the muscle by training, have some dietary protein, I think, it's a great, great strategy. And that's what I have my family members do and my patients do. And you know my patients, they're tough.

SHAWN STEVENSON: Yeah. Yeah, that's what it could be. It could be normalized, but it's going to take... There's something that you said earlier that I want to make sure that we put some emphasis on, which is, even though the science might be so hardy around the importance of resistance training and protein intake, it could take decades for what's being taught in the most prestigious universities.

DR. GABRIELLE LYON: I know. Yeah, it's true.

SHAWN STEVENSON: So, there are going to be students right now who are being taught things that are ineffective, and to say outdated is an understatement.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: So, the question I want to ask you which... Well, first of all, just a point of emphasis, it's because, as you said, there are people who... It's regardless of the science, who just are so deeply ingrained in their belief system...

DR. GABRIELLE LYON: Yes.

SHAWN STEVENSON: In their dogma. And this is one of the things I admire about you. And I've worked on myself to have the capacity to be wrong about it. Again, maybe statins of just like there's some superpower, I'm going to...

DR. GABRIELLE LYON: Right.

SHAWN STEVENSON: Mutate and we're going to be able to fly.

DR. GABRIELLE LYON: Right.

SHAWN STEVENSON: I got to keep that open window to that being different from my perspective, but still standing on my experience of just like having that window open. Whereas in academia, there are these very rigid things and it's all, again, we got to look at who's funding the nutrition programs, General Mills...

DR. GABRIELLE LYON: It's tough.

SHAWN STEVENSON: And these processed food companies.

DR. GABRIELLE LYON: Yeah. Yeah.

SHAWN STEVENSON: So just to be like, they're not just going to change things just because science has shown otherwise. There are systems in place.

DR. GABRIELLE LYON: There are systems in place...

SHAWN STEVENSON: Right. So...

DR. GABRIELLE LYON: There are policies in place. Yeah.

SHAWN STEVENSON: The question I want to ask you is...

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: With this being the case, how do you feel we can accelerate this education?

DR. GABRIELLE LYON: We're doing it. You and I are doing it. This is the way; this is the way of the future. It's exactly why I launched my podcast. Exactly, this is exactly the reason.

SHAWN STEVENSON: Yeah. So, shout out to your podcast.

DR. GABRIELLE LYON: Yeah, yeah.

SHAWN STEVENSON: Let everybody know about.

DR. GABRIELLE LYON: Yeah. The Dr. Gabrielle Lyon Show, clever name, I know, I just wanted to make it easy to find. But the whole goal is to have transparent conversations, it's all about education, it's all for people to be able to educate, ask... My first guest is an expert on protein restriction, she's a world-class scientist on protein restriction, that was my first guest.

SHAWN STEVENSON: That's awesome.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: Yeah.

DR. GABRIELLE LYON: Because the more transparent conversations we have, the more... Our end desires are not different, we all want the same thing for humanity. And if we... Instead of being so divided, we can interface, then we're really going to move the needle.

I love it, I love it. Dr. Gabrielle Lyon, you are amazing. And you said a line, I don't know if you caught this, you said, "This is the way." That's... Shout out to The Mandalorian, Star Wars Universe.

Because that's powerful, that's powerful. And people can check out your amazing podcast.

Yeah, my podcast. If they're interested in becoming a patient, they can apply, there is an application process on my website. They can find me on YouTube, we have a newsletter, a free protocol, all the places.

SHAWN STEVENSON: Awesome, we'll put all that in the show notes.

DR. GABRIELLE LYON: Thank you so much.

SHAWN STEVENSON: If you could share your website.

DR. GABRIELLE LYON: Yeah, Dr. Gabrielle Lyon.

SHAWN STEVENSON: Perfect. Easy...

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: Easy peasy.

DR. GABRIELLE LYON: Yeah.

SHAWN STEVENSON: Well, again, I appreciate you so much for the work that you're doing.

DR. GABRIELLE LYON: Of course.

SHAWN STEVENSON: Thank you for taking the time to come and hang out with us.

DR. GABRIELLE LYON: Oh my gosh, anytime.

SHAWN STEVENSON: It's always awesome. And we're about to do this push-up challenge.

DR. GABRIELLE LYON: Yeah, yeah. You're going to win.

SHAWN STEVENSON: We'll see, we'll see. Well, I appreciate you all for hanging out with us. Dr. Gabrielle Lyon, everybody. Thank you, thank you, thank you for hanging out with us today, I appreciate it so much. I hope you got a lot of value out of this episode, if you did, please share it out with your friends and family, share the love, sharing is caring. Listen, we've got some amazing master classes and powerful interviews coming up very, very soon, so make sure to stay tuned. Take care, have an amazing day and I'll talk to you soon.

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