

## The Human Upgrade: Episode 1097

[00:00:00] **Dave:** You're listening to The Human Upgrade with Dave Asprey. Today, we're going to talk about something that everybody wants at some level or another. It's muscle. If you read Smarter Not Harder, one of the major chapters in the book is like, how do you put on muscle without doing a lot of work?

[00:00:20] Because it's very important that you be capable of working hard, but it's also very important that you conserve your energy to do things that matter. And so if you're willing to spend four hours a day in the gym, you can probably put on muscle, except it won't work because you'll get cortisol.

[00:00:36] But there's something that really we haven't seen in the world of longevity, if you go back to Superhuman, and it's that muscles drive longevity. So having enough muscle, and there's an upper limit where being a balloon animal probably isn't good for you, but if you want to live a long time and you've fallen for the plant-based nonsense science that's out there to sell more Froot Loops, you're heading in the wrong direction from a longevity perspective because you're getting sarcopenia. I've written about how you lose tissue over time.

[00:01:09] So I thought it would be fun to have Dr. Gabrielle Lyon on, who calls what she does, muscle-centric medicine. She's got a big podcast. We're friends. We actually had, I think, matching outfits at the last Biohacking Conference because apparently, she has the same fashion designer I do. For me, it's Instagram, but I'm wearing my Tron shirt today.

[00:01:30] But she's less of a nerd. She's just more goth. Anyway, what I've found is that Gabrielle really knows what she's talking about. She's fearless about, especially for women, saying, guys, eat some freaking steak already, and you might live longer and feel better. But it's not just steak. And she's looking at aging, and her new book is Forever Strong: Science-Based Strategy for Aging Well.

[00:01:53] So we're going to talk about that. But you've heard or talk about protein online probably as much as I have, and you've heard me talk about maybe you might want to eat some steak or whatever else. And we'll talk about that because that's the book, but I want to talk about some other stuff like, how do you trick your kids into eating steak? Let's go into some subjects you don't normally talk about. You down for that, Gabrielle?

[00:02:14] **Gabrielle:** Yeah. I love it. I'm so excited. Thanks, Dave.

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[00:02:17] **Dave:** I'm super happy to have this conversation.

[00:02:20] So let's cover aging and protein. What's your take? Give me your hypothesis for the book in two sentences or less.

[00:02:31] **Gabrielle:** First of all, I'm going to preface this by saying that I'm a trained geriatrician. For individuals who don't know what that is, that is a specialist in individuals over the age of 65. So I did my fellowship in aging. The hypothesis of the book is quite simple. It's that muscle is the organ of longevity, and the pinnacle for health and wellness, especially as it relates to aging. Determines everything. Three sentences? Was that two sentences, or did I nail it?

[00:02:59] **Dave:** It's like when the teacher comes to you in high school and says, there's only one question on the test. Everyone's like, yay. One question has 17 sub components, each with three sub sub components. So you answered it in two sentences, but I like how you added a preface. So that was very sneaky, but respect.

[00:03:16] That was a good thing, like, hey, I've studied aging medically, and you guys missed muscle. And we're talking about NAD. We're talking about mitochondrial function, all those things, which help with muscle. But if you do those and you don't have muscle, what happens with aging patients?

[00:03:34] **Gabrielle:** Yeah, this idea of skeletal muscle health has really been overlooked, and I appreciate you giving me the opportunity to speak about skeletal muscle as, again, the pinnacle of health and wellness and this organ of longevity. There's something very fascinating, and I just want to point this out to the people in the collective and your podcast listeners, is that we have been hyper focused on symptomology, meaning we've been hyper focused on end state of aging, whether that is Alzheimer's disease, or later stage cardiovascular disease, or even obesity, type 2 diabetes.

[00:04:13] These are diseases, in my opinion, and the evidence would support this, of skeletal muscle first. So understanding and putting skeletal muscle into this framework of not just physical excellence, because, by the way, I'm sure you guys saw Dave is very ripped right now, lean and ripped, but really skeletal muscle is this organ system.

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[00:04:35] It is an endocrine organ system, and it determines everything from glucose disposal, which are the carbohydrates that you eat, to its function as an endocrine organ through contracting skeletal muscle release of myokines. Now, your original question was, let's say you do NAD and you support mitochondria. That's all wonderful.

[00:04:57] And the reality is, mitochondria, which a lot of mitochondria is found in skeletal muscle, skeletal muscle goes through physiological changes as we age. For example, anabolic resistance. This idea that skeletal muscle is a nutrient sensing organ, which is fascinating. This idea that skeletal muscle senses the quality of the diet through the amino acids that are presented to it. And that efficiency of protein utilization declines as we age.

[00:05:29] **Dave:** Here's a question. You say this happens as you age.

[00:05:33] **Gabrielle:** Potentially, yeah.

[00:05:34] **Dave:** There you go. That was the little asterisk. It doesn't always happen as you age. It just happens if you don't do something about it, because it's really important for listeners to get that vibe there. You can control this, but if you don't control it, it will happen.

[00:05:44] **Gabrielle:** I actually really appreciate that. In the literature, there's a large body of evidence related to aging skeletal muscle, this concept of sarcopenia, which is a decrease in muscle mass and function, and also a handful of causes related to what we would call the hallmarks of aging. You said something very smart, and it's this idea that these things don't have to happen. A large majority of the research that we look at from aging are healthy, or sedentary adults, or--

[00:06:18] **Dave:** Healthy my ass. Those are not healthy people.

[00:06:21] **Gabrielle:** Exactly. So the framework that we are viewing these physiological changes in skeletal muscle while we call them healthy older adults, the physical activity or the stimulation of skeletal muscle, they are a disease population. And one of those changes with anabolic resistance, does it need to happen? Potentially, it does not. So you're absolutely right. Potentially, it does not. And again, can you overcome it? Can you change it? Yes.

[00:06:48] **Dave:** You're pointing out a major problem right now. It's that almost every test you can get done compares you to muggles. And if you're a biohacker, you are not normal. You

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ideally are several standard deviations away from normal, which means you're abnormal in the best possible way. Superman's abnormal too. And it's not a bad thing.

[00:07:09] So that means that any study you read on aging was they looked at a whole bunch of sick people to see what they did. But those people are not like you. The statistics on those things are not like you. And the lab values they target are not like you. Like at 40 Years of Zen, my neuroscience company, every quantitative EEG done, and brain aging actually goes along with muscle aging, they compared them to a set of brains that were scanned in the 1970s from a bunch of muggles.

[00:07:39] These are people who are not healthy, who are smoking, who are drinking. They didn't do any controls. Just a bunch of random people. And there's nothing wrong with being a random person. It's just that that might not be what's for you. So I have a database of 1500 super brains of people who are into biohacking and brain training, and when you compare yourself to that, it's very different. Right now you can't really say, how do I look compared to super agers on these things in most studies? But you probably can with a measure of skeletal muscle mass, right?

[00:08:08] **Gabrielle:** Yeah, you can.

[00:08:08] **Dave:** How would you do that?

[00:08:09] **Gabrielle:** First of all, I've never heard the term super agers. Is that your term? I love that.

[00:08:15] **Dave:** There is super centenarians, which has been used. James Clement, I think, is the one who studied them the most who's been on the show, but super agers are just people who age really well. I think I made that up, but I might have heard it--

[00:08:25] **Gabrielle:** I love that. I've never heard it.

[00:08:28] **Dave:** Okay. I think it might be an original accidental invention.

[00:08:31] **Gabrielle:** I love it. Let's talk about, especially for the biohackers, this idea of optimal skeletal muscle. And before I provide you with an answer, I want to tell you where the massive flaws in the way of thinking and looking at skeletal muscle are. Right now, we are very good at measuring fat mass.

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[00:08:51] And in fact, that's what we've done. We've measured fat and bone. DEXA, which is considered the gold standard, by the way, there are again, large bodies of evidence. This is the shoulders that we stand upon. This idea that DEXA is going to tell us the amount of skeletal muscle, and the optimal amount is flawed on a fundamental level. Are you ready?

[00:09:13] **Dave:** I'm so happy you said this. Okay. Tell me why.

[00:09:15] **Gabrielle:** It doesn't actually measure skeletal muscle mass directly. DEXA, that we have been using, does not directly measure skeletal muscle mass, nor does it measure the quality of the tissue. As an individual ages, skeletal muscle, if it is sedentary, there's this decrease in flux. It's like an overpacked suitcase. Skeletal muscle that is not trained and leveraged with physical activity will become like a marbled steak.

[00:09:44] **Dave:** Yes.

[00:09:45] **Gabrielle:** This is one major cause of insulin resistance and the subsequent diseases that follow, but skeletal muscle is not measured directly routinely nor in literature. The way in which it can be would be potentially MRI or CT. The majority of people do not have access to that. And it is also not used in most research studies. So right now what we have is an extrapolation or an estimation of lean body mass, which is not the same as skeletal muscle mass. And we are not directly measuring it. So actually, Dave, I have no idea what your optimal muscle mass should be.

[00:10:27] **Dave:** This raises a couple of questions. Number one, the founders of Penuvo, or the founder, the chief medical officer, which is a whole-body MRI technology, have been on the show. I did it at their first beta location in Vancouver about five years ago and again last year in LA, and that gave really good indication of these things, including things like liver fat, which isn't a muscle, but my number was, I think, under 11/2%.

[00:10:57] It was very, very low range, which is really important because if your liver is fatty, you probably have fatty muscle. And if your liver is not fatty, you probably don't have fatty muscle. I don't remember though, in my score, a muscle quality score, even from those guys. So how would I get that?

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[00:11:13] **Gabrielle:** That's a great question. Again, these standards are not done yet. They don't exist. These are major gaps in where we are. One way in which you would see the quality of skeletal muscle is basically, I'm sure that there is a calculation where they would be able to look at intramuscular fat potentially.

[00:11:31] **Dave:** There is--

[00:11:32] **Gabrielle:** But not routinely done.

[00:11:34] **Dave:** Okay, so I'm guessing that they could write the code for that. And I will actually ask Penuvo about that because they rewrote all of the software using AI to subsidize. I don't think it would be a hard challenge, so let's ask them.

[00:11:46] **Gabrielle:** Yeah.

[00:11:47] **Dave:** Maybe you can advise them.

[00:11:48] **Gabrielle:** And the other thing with muscle, there is likely a genetic potential. And I think striving to reach whatever that individual potential is is important because skeletal muscle ultimately becomes your body armor. And do you have to spend four hours at the gym to get there? No. But again, thinking about there's a genetic propensity for an individual to put on skeletal muscle and providing yourself with strategies to be able to optimize that genetic potential, I think, is absolutely critical.

[00:12:22] **Dave:** Thank you for mentioning genetic potential. I was changing shirts before we started recording, and I'm pretty ripped right now. And so you caught a glimpse of that as the cameras were turning on. I work out 20 minutes a week, but I'm doing the stuff in Smarter Not Harder. I'm doing Upgrade Labs, technologies that are AI driven to put a stimulus in.

[00:12:42] So people are like, oh my God, 20 minutes a week. Because six years ago, I had my jeans tested and compared to a bronze, gold medalist in one of the strength things, and my genes were 2% better than his for strength things. So yes, I have the genes to put on muscle. So someone else might need 40 minutes a week if they don't have the same genetic potential.

[00:13:06] I also, and this is where I want your advice for especially younger listeners, in my early 20s, when I said I'm going to lose my 100 pounds of fat, no matter what, I hit the gym 90 minutes a day, six days a week for a year and a half. I could max out all but two of the machines.

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I was really strong. Still had a 46-inch waist. I was still fat. It didn't work right. But I believe all of that set me up to be able to put muscle on easily later in life because I was conditioned that way as a young adult. So what would you tell younger people to do about that?

[00:13:37] **Gabrielle:** So I have two thoughts on that. Number one, training younger is very advantageous, and there's been a lot of information out there saying that when you are younger, it's going to stunt growth. I have two very little children, and that information is false. It doesn't stunt growth, and it doesn't affect growth plates. The younger--

[00:13:58] Even really heavy lifting? It doesn't necessarily even have to be heavy. Heavy is all relative.

[00:14:03] **Dave:** I looked at this a lot for my kids because they wanted to do the Upgrade Labs AI thing that flexes your bones, and I found some pretty--

[00:14:10] **Gabrielle:** That can be different.

[00:14:11] **Dave:** Okay.

[00:14:12] **Gabrielle:** But again, you are talking about something that is utilizing AI as opposed to what is available for a non-biohacking child.

[00:14:22] **Dave:** A bit like a max weight deadlift for a six-year-old is probably not a good idea, but they should be doing strength work, but just max heavy strength work. I've told my kids, wait till you're 18. Maybe 16. What do you think? I've seen 16-year-olds on rowing teams actually stop rowing because of overtraining, but that may be volume of training, not because of actual strength.

[00:14:43] **Gabrielle:** Right. I think that one could say probably a max deadlift at six or 16 maybe too young, but I think that based on the data, and lifting, and stimulating muscle, whether it's for muscle hypertrophy or strength, that there is no good clinical indication for individuals to not be training young.

[00:15:05] **Dave:** Amen. Double down on that. One of my most recent proud father moments was when my teenage daughter spent some time with me and watched me biohacking. We were traveling to a Vision Lock Counties conference in Europe. And so I went to the gym with her, and she's like, this is fun. And then she said, you know what, I can do this twice a week.

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[00:15:26] It's only going to take me 20 minutes. We have this stuff at home. I'm like, yeah. But she made her own decision to do it. It's fun, and it's not every morning. And for a teenager who just wants to feel good, not become a bodybuilder later in life, how much weight-bearing exercise, how often is ideal?

[00:15:46] **Gabrielle:** So this is a great question because from your perspective, I think you've been able to kind of biohack the system. So I'm going to give you information from traditional literature, not using AI, not using any stimulation. There is a very easy rule of thumb. Individuals training three days a week. You could train three to five days a week. Again, there is a strength continuum, so you don't have to necessarily load super heavy. And we've all heard this, the 8 to 12 repetitions. Again, could you do more than that? Absolutely. But I think starting three days a week is a perfect place to start unless you are Dave, unless you are using AI and working 10 sets. The other side to that, 10 sets per muscle group, is a very generic recommendation. This is a very generic recommendation.

[00:16:38] **Dave:** You're fitness competitor level. I've seen your Instagram. You're like, look at my apple bottom, and whatever the hell else you call it, but you are super fit. You're a gym rat, and that's a compliment, not an insult at all. But you love it. You want to do it. My kids are studying, and they have stuff they want to do. Talk to me about minimum effective dose for teenagers because they're more likely to do that. Three days a week is a lot to ask for a teenager who has a busy life.

[00:17:02] **Gabrielle:** Potentially. Or are we training them to create physical discipline? So I will say there is that. There's the physical discipline aspect. The minimum effective dose could be some high intensity interval training. I'm curious to hear what kind of training you're doing, but for example, Martin Gabala created the one-minute workout, and he's up in Canada, and that is full-out maximum effort. And that would just take a minute of total work, and you would be toasted.

[00:17:34] **Dave:** I would do that three times a week with kids. That's fine. What I'm doing now is pretty much a variety of the things in the strength chapter of Smarter Not Harder. So I'll use blood flow restriction, which amplifies the results you get, even if you use less weight. Electrical stimulation sometimes. I'll use resistance bands instead of lifting weights.



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[00:17:55] And I pretty much don't lift weights unless I'm at a hotel, and I'm like, oh, I guess I'll do some flies or whatever just because. And if I do that, I never spend more than about eight minutes doing that, and I just exhaust the muscles as fast as humanly possible because all the data that I've seen from doing research on the books says the faster you exhaust and then the faster you recover equals more growth and less time.

[00:18:18] But if you exhaust, exhaust, exhaust, exhaust, exhaust, exhaust, and then recover, your body doesn't adapt as quickly, so you don't see the same benefits. There may be some upper limit if you're a fitness competitor and a bodybuilder or something, but for me, I want to minimize the amount of time and energy that I put into maintaining my-- right now I'm probably around 71/2% body fat.

[00:18:41] **Gabrielle:** I would guess that.

[00:18:42] **Dave:** And I have exceptionally dense bones. I'm in great shape. New York Times says I'm almost muscular, which is the vibe I want to live a long time. If I put on another whatever X number of inches, I'm actually going to have a hard time fitting in shirts. And I don't know that I'm likely to live longer if I had a much larger chest than I do now. Or am I? I don't know. You would know.

[00:19:05] **Gabrielle:** I have thoughts on this. The skeletal muscle as body armor. Let's say you were to get injured, knock on wood, that never happens, or you were to get sick.

[00:19:16] **Dave:** Mm-hmm.

[00:19:17] **Gabrielle:** An individual, whether they are 40 or 20, will lose around two pounds of skeletal muscle in seven days, probably closer to five days.

[00:19:30] **Dave:** Depending on what they're eating, right?

[00:19:32] **Gabrielle:** There is a grace period of about seven days with an increase in leucine content. So there is a grace period, but after seven days, that immobility is devastating for both strength and muscle mass. In an ideal world, that never happens. But the reality is, if in fact something were to happen, I would always-- less, not more.

[00:19:55] **Dave:** What do you mean--

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[00:19:56] **Gabrielle:** In the world where--

[00:19:56] **Dave:** More not less. More muscle, not less.

[00:20:00] **Gabrielle:** More muscle rather than less. There is no evidence to support that more muscle mass would be detrimental. I have not seen that. Now, we're not talking about bodybuilders using super physiological doses of any kind of hormone that's changing their muscular tissue. We're not talking about that. We were talking about--

[00:20:23] **Dave:** There's a certain amount of load on the heart if you're walking around with three times the normal amount of skeletal muscle mass that's probably not good for you, and we see cardiac issues in those exceptionally large body builders. But who knows? Maybe it is from all the roids. I'm doing my best to not talk about [Inaudible] right now.

[00:20:41] **Gabrielle:** Also, what you said, body mass, you have to pump a lot of blood. So I do think that there is evidence to support a more muscular body rather than a less muscular body in the idea of framing with prevention. The other thing that becomes really important is that we've seen this. We've seen that individuals who lose skeletal muscle have higher blood levels of glucose, have more insulin resistance, and oftentimes have elevated levels of triglycerides.

[00:21:16] **Dave:** It makes so much sense because what is the muscle doing? It's actually using blood sugar. And if you don't have muscle and you have blood sugar, what's it going to do? And it's also going to build up, which then you get advanced glycation end products, which is one of the major causes of aging, and it's just a bad situation.

[00:21:34] But I have a little story about the value of muscle mass. About 25 years ago, my father was in really good shape because he'd been training in order to walk the Rocky Mountain trail that goes from Mexico go to Canada, and he was really, really into these long-distance solo backpacking. And he started getting pain in his stomach, really, really bad pain. Went into the hospital, and they said, we think it might be your appendix.

[00:22:04] And he goes, I don't have an appendix. He just remembered it being taken out, but it wasn't. So it went gangrenous and exploded. And you know, as a doctor, that can be fatal when you start doing that. Because he was so muscular, he survived. But he lost 25 pounds of skeletal muscle during his recovery.

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[00:22:23] If he hadn't had that muscle, he would have died. And he says that to this day. So yeah, if you get in a car accident, something bad happens, I don't know, government tells you you can't leave your house for three years, whatever, having skeletal muscle mass might be good for you.

[00:22:37] **Gabrielle:** I would agree with you. And it's interesting that you have that experience. And that really speaks to the importance of skeletal muscle. And that's really why I wrote this book. This book changes the paradigm of thinking, really re-emphasizing this idea that skeletal muscle is at the focal point above and beyond looking jacked and tan, which now you are both, and really moving it away from bro science, but putting it in the framework of medicine and health, wellness, and longevity, which brings, I think, us up to a really important point.

[00:23:12] There is a lot of information about this idea of chronic protein restriction helping with longevity.

[00:23:17] **Dave:** You've gone deep on that. Let's talk.

[00:23:19] **Gabrielle:** And if, for example, like your father had the experience and believed that skeletal muscle is this organ of longevity, that it is critical as body armor, that it is an amino acid reservoir if you were to get into a car accident or become catabolic, which is exactly what happened to your dad, then if we are chronically underfeeding dietary protein, and we know that there's really only two ways, although Dave, maybe you have, found other ways to support skeletal muscle, but for most of us, the two main ways are through these amino acids and through resistance training or some kind of stimulation to the tissue.

[00:24:01] **Dave:** I actually have a meat inhaler. I just take two puffs of steak, and I'm totally done--

[00:24:04] **Gabrielle:** So you guys, I was at Dave's conference, and the first thing he said is like, did you have your meat today? It's a joke, right? He's busting my chops about the meat. And listen, I would love to stop talking about protein, but in the wave of the nutrition information out there, I can't. At least I can't stop talking about it yet, but trust me when I tell you I cannot wait to transition from this conversation.

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[00:24:32] So the reason I bring this up is because if the individuals in the longevity space are talking about further reduction of dietary protein, let's say below the RDA-- so the RDA is what, 0.8 grams per kg, 0.37 grams per pound of body weight. Now, if you further restrict dietary protein, the support of skeletal muscle really suffers. The question then becomes, how do we maintain that tissue? Not necessarily when-- for example, your kids are young. They can maintain tissue. But as we begin to age and withstand the test of time, we have to be able to support that tissue.

[00:25:12] **Dave:** There's a great evil happening right now around people saying you need X amount of protein. And you and I are part of the problem because you have to add the word animal because plant-based proteins actually don't do the same thing. And so I find myself saying X amount of protein. So even when I wrote my anti-aging book, I went through hundreds of studies on protein, and aging, and mTOR.

[00:25:35] And the preponderance of evidence said that for longevity, you might want 0.6 to 0.8 grams per pound of body weight. And I tried that for a while, and it doesn't work very well. One gram per pound of body weight works a lot better. And I went really deep after the book came out and said, all right, let's look at what actually raises mTOR. Because the primary reason that they say don't eat animal protein is because it will raise mTOR. But tell me, what raises this mTOR compound way more than protein?

[00:26:08] **Gabrielle:** Yeah. Let's talk about mTOR, which is mechanistic target of rapamycin, which this is a complex that is a growth promoter, and it exists in all cells. It's an all tissue. So it's in the brain, the pancreas, the liver, skeletal muscle. Now, this idea that mTOR is, again, this cascade activation that happens through leucine stimulation in skeletal muscle.

[00:26:39] And that becomes so critical, but the reality is if we look at mechanistic target of rapamycin, which people have really gotten their teeth into as it relates to aging and growth promoting as an issue with cancer, etc., is that mTOR is stimulated, for example, in the liver or the pancreas more robustly by insulin or excess calories. This is very critical to understand.

[00:27:08] **Dave:** Wait.

[00:27:09] **Gabrielle:** Mechanistic target of rapamycin in skeletal muscle is stimulated by leucine.

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[00:27:15] **Dave:** Doesn't that mean that a plant-based diet raises mTOR, which is pro-cancer and pro-aging, more than even a carnivore diet, which I don't recommend for more than short periods?

[00:27:25] **Gabrielle:** Yes. That would be a reasonable thought process because we are stimulating mTOR and other tissues, again, potentially more frequently. If you are having multiple small meals, if you have higher levels of insulin, higher levels of carbohydrates, yes, that would be a major issue. The idea of reducing amino acid intake, the idea of reducing dietary protein to dampen mTOR signaling and skeletal muscle makes no sense.

[00:27:55] It makes no sense from an aging perspective. It makes no sense from a health perspective. And the idea that you would stop eating animal-based products because of mTOR, I think, is one of the most dangerous narratives that we're going to see in aging. I think that we, quite frankly, are going to see epidemics of sarcopenia and osteoporosis like we have never seen before in the history of ever.

[00:28:19] **Dave:** Who's that guy who just ripped his abdominis, abdominal whatever, off of his abdominal wall from trying to run? He went vegan, and two years later, he's like, my guts just shredded themselves. You know what I'm talking about? Was it Chris Rock or somebody? I don't remember. You know what I'm talking about?

[00:28:32] **Gabrielle:** I have no idea.

[00:28:33] **Dave:** It just happened. Some famous guy. It probably wasn't Chris Rock, but it was like, what the heck is going on here? And even the famous sprinter, who broke all these world records and went vegan, did that and said, I feel really good. I feel really light. And then he got injured every year after that and didn't break any more records except for that first little window because his muscle quality went away.

[00:28:54] And so we're going to see this in everyone. There are two amino acids in animals that do raise mTOR. It's methionine and tryptophan. And there's not a lot of that when you're looking at plant proteins, but all the plant proteins come bundled with huge amounts of carbs that raise mTOR via a different pathway. So here, beans and rice to get protein, you're going to get 400 grams of carbs along with that little bit of amino acid, so it's dumb.

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[00:29:23] **Gabrielle:** I do love the mention of methionine. And that is one of the limiting amino acids. So methionine, lysine, and leucine, all of which are limiting to various degrees. Now, a vegan diet would primarily be a diet of methionine restriction. Where potentially could that be of benefit? I think that there may be one reason, and I haven't fully decided on this, but this idea, during cancer, potentially methionine restriction, because it's a precursor for a lot of growth, could be beneficial. That may be one reason why I would consider methionine restriction, potentially.

[00:30:04] **Dave:** By the way, the Upgrade Collective live audience came through. It was Kevin Hart that I was trying to think of. I just saw it in Instagram posts, but I couldn't remember who it was. But yeah, Kevin Hart, just massive injury because he was vegan and got injured. Just to correct what I was saying earlier. Sorry, Chris Rock, it wasn't you.

[00:30:19] **Gabrielle:** And Dave, I have to say, though, you're bringing up a good point. We talked about protein in a generic term. We talked about it as if it's one thing, as if it's one macronutrient, but it is really based on 20 different amino acids, all of which are in various amounts in protein. Ultimately, where I see protein research going is we are going to identify and begin discussing these individual amino acids as individual nutrients. And especially, the limiting amino acids, methionine, leucine, and lysine. And that is where, if we get it right, the future is going.

[00:30:56] **Dave:** One of the things I've been recommending, since even before I started the biohacking movement was taking extra collagen because it has glycine, which counteracts extra methionine. The primary reason collagen is a billion-dollar industry today is because of just putting it into the biohacking world.

[00:31:15] I've also seen people talk about, and I've experimented with taking glycine, which is the primary amino acid in collagen, in order to counteract that grass-fed ribeye that I had for dinner. So what are your thoughts on upping either collagen or glycine in order to balance out methionine?

[00:31:33] **Gabrielle:** I love this question, and I'll start off by saying that most-- so there is benefit to collagen. The primary benefits to collagen I see are hair, skin, nails, joints. Not good

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for muscle. The other important aspect of collagen is-- again, the amino acid ratio is very different. It has a protein score of zero.

[00:31:54] I will also say that in the literature, the studies are not done well on collagen. Typically, where collagen is used is they will have a already sufficient protein diet and then add collagen on top of it. And this is for the real nerdy biohacker out there listening, is the control groups overall, I have not seen a well-done collagen study first and foremost.

[00:32:17] **Dave:** Even on mice.

[00:32:17] **Gabrielle:** Huh.

[00:32:17] **Dave:** Even on mice.

[00:32:19] **Gabrielle:** I try to really turn my attention towards human studies. So once they validate the study in rodents, then they typically move to humans. For human studies, I have not seen them well done. I have seen them adding collagen to an already sufficient protein diet, which isn't going to do anything.

[00:32:39] **Dave:** I disagree.

[00:32:39] **Gabrielle:** Now, so your comment about-- what?

[00:32:43] **Dave:** It does do something.

[00:32:45] **Gabrielle:** But the studies need to be done better.

[00:32:47] **Dave:** Okay. Here's what it does. It's okay to shoot it down, but here's what I found from going through all the research. I had to get really nerdy on this because years ago, the first time I was on Dr. Oz, someone called him. My friend, John, called him and said, hey, you should have Dave on the show.

[00:33:06] He's like, are you going to be in New York? I said, funny, I'm going to be there tomorrow. And so I go into his office, and he's got three doctors and him there, and they just grilled me about collagen. So I was really heavily prepped. [Inaudible] wrote a book about it. And what you'll find is that collagen peptides, which is what I've always used for collagen, that they serve a signaling function, the di and tripeptides, apart from their protein content.

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[00:33:31] So when you're eating these things, it's telling your body that your skin was injured, or your joints were injured because it's floating around, so then it actually upregulates your collagen production. But there's a signaling effect from collagen peptides apart from the amino acid content. And I think there's something going on with that. What do you think?

[00:33:49] **Gabrielle:** I love the idea that there's a mechanism. I think in really good science, there always has to be a mechanism and--

[00:33:55] **Dave:** That's not true. That's such bullshit.

[00:33:57] **Gabrielle:** I think it's true. You have to provide me with a mechanism. I need to know a mechanism of action, or there's nothing that is substantiated.

[00:34:04] **Dave:** Okay, check this out. We notice that if we put fire to wood, it catches on fire. The mechanism is leprechauns. There. Do you feel safer? Because seriously, every mechanism we believe in is a total story.

[00:34:20] **Gabrielle:** Yeah, no.

[00:34:20] **Dave:** We don't know quantum tunneling works inside of cells. We have a hypothesis for mechanism, but if A usually makes B without any mechanism, it's still science.

[00:34:32] **Gabrielle:** Again, I'm a traditionally-trained scientist. I still like to see a mechanism.

[00:34:37] **Dave:** So you like leprechauns?

[00:34:39] **Gabrielle:** Yeah. And mechanisms. And you guys, we're riffing, but Dave and I are friends, so--

[00:34:46] **Dave:** Oh, totally. No, there's no hostility at all.

[00:34:47] **Gabrielle:** No, no, no, we're friends. So I do like to see a mechanism. And that really comes from training and fellowship. The other thing that you mentioned about this idea of an influence other than amino acids, there's another really important place that that is highlighted, and that is methionine restriction. So I do like what you are saying because in methionine restriction, it's not an issue with the amino acid per se.

[00:35:11] It is the response of the lack of methionine that ultimately causes this integrated stress response. And so at least what I'm hearing is it's a very similar type of influence. And again, it's



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not based on the amino acids, but it's based on potentially even-- maybe it's due to the unbalance of the peptides.

[00:35:35] **Dave:** I think there's a lot of work to understand that.

[00:35:38] There's one guy who I've known for 25 years who was on the show a while ago. I mentioned him earlier, James Clement. And he wrote a book called The Switch. And to take advantage of everything we're talking about, what he proposes and what he does, because he's a really aggressive anti-aging guy-- in fact, when I met him 25 years ago, it was at the headquarters of the Life Extension Foundation. Just an old school aging nerd like me.

[00:36:02] And what he proposes is that methionine restriction has good evidence. So for one month, go on a keto plant-based diet, which is really hard to do because plants are mostly carbs. So you do that, and then the next month you go on a high protein, high meat, grass-fed keto diet and have some carbs. It doesn't have to be keto all the time, but keto much of the time. So basically, you're not eating a lot of carbs when you're methionine-restricted so then you go into a low mTOR state.

[00:36:30] And then the next month, you go into a high mTOR state. So he wants to create this monthly wave of up and down. The science is pretty strong in his book. I just don't know anyone who's willing to do a month of keto plant-based diet because it's just like MCT oil, coconut oil, and I don't know what else you eat. It sounds horrible to me.

[00:36:50] **Gabrielle:** It does sound horrible. And then the question is, I know that there is some sparing effect on skeletal muscle. My priority is, again, how do we maintain an optimized skeletal muscle as we age. And dietary choices become extremely relevant as well as activity, the activities that you're choosing. So that would be one of the things that I certainly would be thinking about.

[00:37:13] **Dave:** Talk to me about spacing of amino acids. So on a typical day, I'm going to wake up, wait a while to have breakfast. Breakfast has some protein, usually, in fact, almost always from a cow. So I'm going to have 50 grams of protein. But it's more than 30. Guys, I weighed 200 pounds.

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[00:37:34] **Gabrielle:** But also, actually 50 would be more optimal for optimizing skeletal muscle.

[00:37:40] **Dave:** It certainly works. So I'll do that. And then I'll have, usually, some carbs. And then dinner, I'll probably have more carbs, lots of white rice, and I'll have a pound of steak or whatever. And I don't really snack a lot. I might have a salad, add a lot of vegetables in it. So I've got carbs and protein at dinner, but then before bed, I'll take 10, 15 grams of glycine, which is there to counteract all the excess methionine. But it's spaced out, so I'm getting my methionine early in the day and glycine later in the day. Should I be spreading my glycine out?

[00:38:15] **Gabrielle:** I think this is a very interesting concept. First of all, I know that you've-- how long have you been doing this?

[00:38:22] **Dave:** Oh, I switch things up all the time. That's what I've been doing the last little while. And I actually haven't run my true age numbers yet because one of the things I'm doing, I haven't actually talked about this on the show, but I'm actually interested in seeing what it does to my aging numbers to actually having been lower on protein, knowing my rate of aging, which is like 0.79 of normal, and then seeing what happens now.

[00:38:44] But there's a caveat. I had to increase my carbs very substantially because I was getting so lean. Everyone's like, you look old. I'm like, number one, I used to be obese, so I have a lot of extra skin. And number two, I'm so lean. You can get leaned out on your face. So I'm like--

[00:38:59] **Gabrielle:** Let's talk about your strategy. So you don't know this, but your strategy of eating is exactly my longevity protocol in the book.

[00:39:07] **Dave:** Oh my gosh. It's where I arrived for longevity because I know a thing or two. It works so freaking well. And I have a lot of coffee too, I should say.

[00:39:15] **Gabrielle:** And this actually tracks along with the science in the way that first meal of the day-- so basically, what you're talking about is amino acid distribution. And after coming out of an overnight fast, then your skeletal muscle is uniquely primed at this time because it is catabolic for this influence of amino acids.

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[00:39:35] Once you stimulate it, and the dose would be around 50 grams for that first meal, I would say, Dave, though, I'd like you to move the meal earlier, one to two hours after waking, because there is something to be said with circadian entrainment. I'd like to see that. But typically, that first meal, and all the studies that I am aware of that are in the literature are really based on that first meal.

[00:39:57] So this idea of muscle protein synthesis of having 50 grams of high-quality dietary protein, stimulating mTOR, stimulating this process, which is a physiological integration of amino acids over time of what we hope to allow for muscle accretion over time, so you're stimulating muscle protein synthesis.

[00:40:17] And then having a second meal later on in the day with a robust amount of protein, around 50 grams or so with a easily 50-gram carbohydrate meal. So you could do a one-to-one ratio before you're going back into an overnight fast is what I would consider to be an optimal longevity protocol. And I know I didn't answer the influence of glycine because I really have to think about that. There is some evidence to support glycine before bed.

[00:40:48] Again, I'm not going to say something that I'm not totally aware of, so I have to come back to you on that, but I love the strategy that you are doing. And here's why. Once you stimulate muscle protein synthesis, there's these initiation factors like eIF4 that are continuously elevated. And we believe that they're at least elevated for five hours and maybe longer. We don't actually know in humans because the studies have not been done in the subsequent meals. So having a middle meal in the day that's robust in protein is unnecessary. If you are happy with your body composition, if you are looking for longevity, it's not a necessary meal.

[00:41:31] **Dave:** Okay. But intermittent fasting--

[00:41:34] **Gabrielle:** Yeah.

[00:41:34] **Dave:** There's robust evidence for not doing it every day. That's why I wrote the whole Fast This Way book. It's like, guys, you're probably overdoing it because it feels good. But it is a useful tool. So the studies, they're pretty robust too, found that benefits start to accrue even in middle-aged women where it's the hardest at 12-hour fasts three times a week, which isn't very aggressive. And for guys, we don't quite know. That was a female specific study. For guys, it's

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probably 14 hours because they actually last longer, fasting on average. So you're saying you want me, within an hour of waking up, to do the protein?

[00:42:14] **Gabrielle:** Hour to two hours. Ideally, the goal is to push your fasting window. I do like this idea of time restricted feeding. I think it's beneficial for calorie restriction. I think it's beneficial for metabolic issues. I would love to see you push that window earlier, and I am totally okay with fasting. There is good evidence, also caloric restriction. We've all seen this evidence. But again, moving the feeding window earlier for the purpose of circadian alignment.

[00:42:44] **Dave:** Yes. We're so much in alignment on that. And the ideal time to exercise and get your calories is two to four in all the research I've seen because that's when available stuff when you were a mitochondria floating in the ocean, eating algae that--

[00:43:01] **Gabrielle:** I was never a mitochondria floating in the ocean. I'm just kidding.

[00:43:03] **Dave:** So I think you just need to do some more regression work. You'll get there. And because of that stuff, yes, and I think it's even the Bulletproof Diet, which is one of the very early intermittent fasting-oriented books. The problem is that very few people who have jobs can have dinner at 4:00 or 5:00 and then not eat anything. And if you wanted to live the longest, you would have dinner by 5:00 or 5:30 and stop eating.

[00:43:29] And then if you were to wake up and go to bed at 10:00 or 11:00, whatever you do, you wake up 6:00, 7:00, you've already got a 12 or 13 hour-fast in there. When I'm home, I'll eat by 6:00 most nights. So I will have a 13 or 14-hour window, but I wouldn't have that [Inaudible]. And when I'm traveling, though, or doing business dinners a year later, I'd just wait.

[00:43:52] I'd rather have the fasting window. It's that long. It's a question of how much are you willing to ruin your social life in order to live a little bit longer? And the answer is I'm willing to ruin mine a lot, but I also appreciate the social stuff, which also is something that makes you live longer.

[00:44:12] So if you live in a cave because you're afraid of dying, you have to do everything exactly a precise way. There's a guy from Russia, a famous biohacker, talked on the show a long time ago, who's doing that. And I know Bryan Johnson right now is like, I have a month straight of 100% sleep scores, which is awesome.

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[00:44:28] But he's also like, because he's doing the science on this, I'm very militant about the timing. I just don't feel like you or I with kids, and school, and jobs, and leadership, and all, that we're always going to do it. So how do you make it work when you have a late dinner?

[00:44:43] **Gabrielle:** Again, it just happens. It's easy. I absolutely agree with what you're saying. I have two very little children and a husband who's working a 100 hours a week in a surgical residency. So we do what we can, but we try to remain as structured as possible. And with that being said, during travel, I personally will push my fasting window later because I know, for exactly the reasons that you're talking about, that I will either be at an event, or I will be doing something later. And so during that time-- I'm actually going to LA tomorrow-- I'll push my fasting window.

[00:45:19] **Dave:** You ever eat gummy bears?

[00:45:20] **Gabrielle:** I do.

[00:45:22] **Dave:** How did I pick that? So you cheat sometimes.

[00:45:26] **Gabrielle:** Yeah. I'm pretty physically active.

[00:45:29] **Dave:** Got it.

[00:45:29] **Gabrielle:** I do.

[00:45:29] **Dave:** I don't eat junk candy with colorings and stuff, but I am exceptionally carbohydrate-tolerant. The level of muscle I have now, I can eat whatever carbs I want, and it probably raises triglycerides and increases glycation end products to a certain extent, but I clear it pretty fast with my CGM, so it's because my body's working right. What about alcohol? Do you drink?

[00:45:51] **Gabrielle:** I don't.

[00:45:53] **Dave:** Me either. Actually, that's not true. I'll drink sake with really good sushi once every month or two, two little glasses. And I take a bunch of stuff to counteract the bad stuff it does for aging, and that's purely enjoyment.

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[00:46:07] **Gabrielle:** Yeah. When I was a fellow doing memory and aging, one of the things that we would-- so basically, we were there evaluating people's brain function, and one of the things that we always restricted was alcohol.

[00:46:18] it's just bad for you. This idea that one cup of wine a day or one glass of wine a day is going to help you live longer. Yeah. Again, alcohol is a toxin. If you are looking to get resveratrol from your wine and that's what you're looking to do, I think there are other ways to do it. Over time, alcohol affects sleep as we know. It affects sleep architecture. It is a very easy and swift way to ruin your nutrition plan, whether it's because it lowers your inhibition or because it has seven grams or seven calories per gram.

[00:46:50] Can you drink alcohol and still maintain a body composition? Yes, but if you're doing all these other things, why? And it tastes like rubbing alcohol, gasoline, whatever it is. I think it just tastes terrible. So I think that there are other ways in which you can find enjoyment other than alcohol.

[00:47:09] **Dave:** I agree. In fact, Tru Kava is what I serve at parties. Kava is kind enough to donate it. And instead of alcohol, we all had a great time, and we didn't make ourselves older. So I'm glad that you're not one of those people. It's like, yeah, you can use alcohol before you train to improve muscle.

[00:47:26] **Gabrielle:** No.

[00:47:28] All right. We didn't talk about fascia, which is so important as we age as well because you can have strong muscles, but if you have weak fascia, you're going to get in trouble. And hernias are a major problem as we age. Talk to me about muscle mass, and hernias, and aging to the extent--

[00:47:46] **Gabrielle:** Yeah. It depends on obviously if it's an abdominal hernia or an inguinal hernia, and it's where the fascia can become weakened. And again, if it's an abdominal hernia, potentially your intestines can get entrangled, and that is not ideal. There's two things that I would recommend to avoid hernia surgery.

[00:48:05] Number one, do not be overweight. Do not have abdominal obesity. Do not be overweight. Do not be sedentary. From a fascial perspective, this is where I do believe training

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against resistance is very valuable. Again, you're using bands. Could someone use weights? Could someone use X, Y, and Z?

[00:48:26] Yes. I do believe that loading the fascia and loading the muscle that is encased in fascia is very beneficial. And over time, improve mobility and just really having a well-rounded program. There's a concept called tensegrity, which talks all about it. I'm sure you're very well aware of that.

[00:48:48] **Dave:** Oh, I love that. Talk about tensegrity for a minute.

[00:48:50] **Gabrielle:** Yeah. So this idea of tensegrity, it's really these fascial planes within the body.

[00:48:57] **Dave:** Functional movement is so underrated, and I try to mention it in my books. I'm actually doing a lot of work right now on functional movement exercises that aren't technically training, but it's turning on little muscle groups. My feet that I'd never actually turned on. I've also seen really intriguing research linking overactivated mass cells. So on prediction, and you heard it here first, guys, there was a virus that's spread around the world, but one of the side effects, and many people who get that virus or get one of the purported treatments for it that was forced on them by their employers, is an increase in mass cells.

[00:49:35] When your mast cells are more active, you get more tissue inflammation. If you get tissue inflammation in your fascia, and you're lifting really heavy with poor technique, you might be more likely to get hernia. But it seems like you're saying you're more likely to get hernias from being sedentary than from being heavy.

[00:49:52] **Gabrielle:** We see that a lot with the military operators that get hernias. So it certainly could be load-based and activity-based, absolutely. But certainly, being overweight and being sedentary is a risk factor.

[00:50:06] **Dave:**

[00:50:06] All right, let's talk about the best three types of protein powder that people could use to get their numbers up.

[00:50:14] **Gabrielle:** I actually love an animal-based protein powder, which could be a mix of any kind of animal-based product, whether it's beef. Typically, the beef isolates are collagen-

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based. So a beef/egg white or egg mix. I love an animal-based product. I also love whey protein because of the immunoglobulins. It has alpha lactalbumin, lactoferrin. And there is some benefit to the immune system, also gut health.

[00:50:41] But typically, I like the combo of the beef and the egg together, as long as the beef is complete.

[00:50:48] **Dave:** Got it. Now, there are many people listening, and there's three reasons people decide that they're going to go vegan. And I know. I was a raw vegan, I was a devout vegan, and it screwed up my health, and it took me a long time to heal. That's one of the reasons I made the Bulletproof Diet, and I'm so passionate about this.

[00:51:03] So guys, I'm on your team, if you're listening to this. Saying, what do I eat? I'm vegan. Just eat steak, and stop being vegan, and you'll live longer, is the core point here. But let's say you're not going to do that. One reason is you want to live longer. We just shot holes in that. The other one is you're worried about animal cruelty.

[00:51:20] Listen to any of my podcasts about deaths per calorie from plants versus animals. You kill more animals with a fake burger than a real burger because you could eat a burger every day for two years off one cow. And you can make sure the cow is treated well because it's just one cow, and it can be easier after it was lovingly put down.

[00:51:35] I know. I raise cows and sheep. I've actually done it. And then the third reason would be some environmental nonsense, ignoring the fact that human vegans fart 17 times more than non-vegans in medical studies. So if you're worried about cow farts, you should also be worried about vegan farts. And there's all sorts of other reasons about building soil ecology, and protecting the environment, and having grazing animals.

[00:51:58] So all those things, that's why you should do, what Gabrielle just said. But there's someone here who's like, yes, but they have cute fuzzy eyes. So what is a plant-based person to do, or maybe someone who wants to eat animals but is forced by circumstances to eat a plant-based industrial separated protein? What's the best one?

[00:52:22] **Gabrielle:** That's hilarious. Well done. There are some fermented-type plant-based proteins that have the same amino acid scoring as say a whey protein.



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[00:52:33] **Dave:** What kind of fermented plant?

[00:52:35] **Gabrielle:** Just fermented, whether it's a rice pea blend of proteins. Frankly, I don't typically use those, but if someone can't tolerate whey, a rice pea blend could be a last ditch effort. The other aspect to this conversation is there is a food matrix, and when we just hyper focus on dietary protein, we do eliminate this conversation of taurine, carnosine, and serine, creatine, bioavailable iron, selenium, zinc, all these other components and low molecular weight compounds in meats and animal-based products.

[00:53:15] So that's separate. If you choose to be vegan or plant-based and you need to get your protein up, which the evidence suggests that an individual who is vegan or plant-based-- by the way, the RDA is not based on a plant-based diet, which we know is low. So if the RDA is based on high quality animal-based proteins, then the minimum to prevent deficiencies for a vegan or vegetarian is going to be higher.

[00:53:42] **Dave:** For vegetarians, it's not a big deal. Just eat a lot of cheese and eggs, and you're probably good to go, right?

[00:53:47] **Gabrielle:** Yeah.

[00:53:48] **Dave:** Vegetarians, you can pull this up. Most of India, there you go-- it's when you get vegan that it becomes really, really problematic.

[00:53:55] **Gabrielle:** And that's supplementation. And quite frankly, personally, I don't recommend anyone who is aging or more mature to be vegan. They tend to have lower bone density.

[00:54:06] **Dave:** Or young people. What about women infertility?

[00:54:08] **Gabrielle:** Agree. But if you're going to do it, you have a little bit of wiggle room till you decide that is not going to work well for you. But when you are older, and I think that that's really who suffer, are the individuals where they want to age well, and the idea of going fully plant-based is their answer. I think that's really bad advice.

[00:54:28] **Dave:** It's terrible advice. Gabrielle, I don't think it's okay for young people. Because you have so much energy, it takes you a while to build up oxalic acid, to feel all the problems. And I did this in my late 20s. And man, it takes you a long time to recover from that. And 80% of

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people who do this don't, and then you've already pre-aged yourself, and then you have to climb out of that.

[00:54:55] It's so much easier to do the anti-aging stuff like the diet you're proposing or that I'm proposing. Do that in your 20s and like, oh my God, I started a company. I got a promotion. I'm happy. I'm fit. My clothes fit right. I don't know why everyone else around me is depressed. And then you didn't age the way that people around you who are drinking and eating a bunch of plant-based nonsense did.

[00:55:15] And you can just practice gratitude when you eat the burger, and it's okay. I think [Inaudible] young people to not age because it's easy. To take older people and make them de-age is really expensive and hard. I know because I've done it. So don't give our young people a get out of jail free card on this. If you don't do it now, you're going to do it twice as much when you're old.

[00:55:39] **Gabrielle:** That's fair. I was both vegan and vegetarian in my 20s.

[00:55:44] **Dave:** Okay.

[00:55:44] **Gabrielle:** And I got pretty sick.

[00:55:46] **Dave:** Okay. So you and me went through the same thing.

[00:55:47] **Gabrielle:** We did, which is one of the reasons I'm so vocal about it, because if you have the capacity to say something, you have a responsibility to do it. Over time, when I was doing my fellowship, I did family medicine. I did two years of psychiatry. I did seven years total of nutritional sciences, and then I landed in geriatrics, and that's really end of life.

[00:56:11] Not for you or the biohackers. You guys are living till, I don't know, 150, but for many individuals, 70, 80 is end of life. And when you are at the bedside of these individuals that are either on their deathbed or soon to be, it really changes your perspective. And if we could go back in time and say these are the things you need to do to execute to age well so you're not ending up in a hospital bed where I am having to do rounds on you, then there's a lot of power to that, and there's a lot of responsibility to be able to change that narrative and that trajectory.

[00:56:49] One of the best things that ever happened to me was in my 20s when I was dealing with chronic fatigue and all this obesity, and brain fog, and just all the nonsense I was going

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through. Someone guided me to an anti-aging nonprofit by Stanford University, and I sat down, the only guy under 50 in the room, with people in their 70s and 80s who were vibing, and thriving, and getting younger, and doing all the anti-aging stuff we're talking about now.

[00:57:15] **Dave:** And they taught me. And it let me restore my brain and then get healthy. And it led me to have the knowledge from my elders to create biohacking. And so spending time with healthy old people as they are fighting the good fight against aging and winning was so inspiring to me. And it showed me what is possible, but it really made me want to take care of stuff now because I saw them, and I also saw other people who were aging so terribly.

[00:57:47] I think it's optional, and that's why I'm also passionate. So both of us did the mistakes in our 20s of going plant-based way before it was cool. It was just misguided, and it was with good intent, I think, for both of us. But it didn't work, and I think you have really strong credentials. You're smart. You also are like, look at how I'm aging, and I'm doing the same thing. I'm aging way better than I ever would have hoped.

[00:58:12] And I'm not aging fully backwards yet, but I have reversed my epigenetic age by 11 years. And it'll get better. I'm about to go do some gene therapy on it. Stuff's going to happen. So anyway, I just want younger people listening, we're not lecturing you. We did this stuff. And you just don't have to make everyone else's mistakes. Make new mistakes that no one's ever made before. Try the all-insect diet and tell me how it works out. Maybe it will. But don't do stuff that we already know doesn't work.

[00:58:38] All right, final question for you. I know we're getting up on the end of the show. Amino acid blends. Years ago, Dr. Minkoff introduced me to his amino blend. There's a few companies out there that make aminos that purport to give you 30 or 50 grams worth of protein that's just amino acids. What's your thought on that?

[00:59:00] **Gabrielle:** It can be used supplementally. Is it necessary if you're eating a higher protein diet? It's not. But again, it can be used supplementally. The other aspect of that is you're just ingesting compounds. So the benefit of eating whole foods will always outweigh the benefit of utilizing these individual amino acids or amino acids complexes.

[00:59:27] The one thing that I will say where there can be benefit is if an individual is unable to eat in a highly catabolic state, an injury. These liquid aminos, there is some evidence that it is

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body protective. And the statement of the full essential amino acids is wise rather than just using a branch chain amino acid for muscle. I don't typically recommend that alone, but an essential amino acid blend for the support of tissue in a highly catabolic state or a diet that is low in sufficient protein, there can be some benefit.

[01:00:01] **Dave:** I think they do work as a supplement. For me, 200 grams of protein per day, that's a lot of steak. It would actually be expensive if I only ate ribeye. I would be spending \$70 a day on steak, which is a lot, and that's if I cook it myself. So I'll eat a good quality steak, and I'll do some supplemental proteins, and I don't mind, especially when I travel, doing aminos.

[01:00:27] What I did do for my kids, though, they're going to a really good school that has a chef. And my kids know how to eat good stuff, and they come, and they're like, dad, they just gave us like chicken breasts again, and we know they have some protein in them, but it's just gross.

[01:00:42] So they've started using aminos because they know they're not getting enough protein, and their school gives them lunch and dinner a lot of the time. And they're just like, this is not the food quality that we get at the farm. So they have a really hearty protein and fat breakfast, and then they supplement with aminos to get around school nonsense selectively. And I think they're both thriving, and maintaining muscle mass, and just very healthy. And they probably could take protein powders. It's hard to mix those if you're in a school environment.

[01:01:13] **Gabrielle:** We have the same experience, quite frankly, and my little over-two-year-old, he uses a protein powder. We use a whey protein powder, and he's growing. It's amazing.

[01:01:23] **Dave:** It makes such a difference. Kids thrive. And it's funny. The parts of China where they've imported enough American pork to increase the amount of animal protein, their kids are three inches taller because of enough protein consumption. So if you want tall kids, you need to max out their animal protein--

[01:01:38] And then final thing, I just wanted to remind our listeners that Forever Strong is the name of your new book, and it's at [drgabriellelyon.com](http://drgabriellelyon.com). Or Leon. How do you say Lyon, Leon?

[01:01:52] **Gabrielle:** Lyon.

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[01:01:53] **Dave:** Lyon. You never know. French stuff sneaks into English, I get so confused. So G-A-B-R-I-E-L-L-E, so D-Rgabriellelyon, L-Y-O-N.com, or just go to The Human Upgrade podcast page. Go to daveasprey.com, and there's show notes, and everything we talked about is all linked and all that kind of stuff. And it's all free for you like it always is for the last 1000 plus episodes. But you can just remember Forever Strong and just use a search engine other than Google, and you'll get good results.

[01:02:22] **Gabrielle:** Thank you so much for having me. Thank you, Dave.

[01:02:24] **Dave:** You're so welcome. And thanks for coming to the Biohacking Conference and just being a tireless advocate of a message that a few loud bullies really don't want out there, which is that ethically consuming animals is necessary for thriving humans. And you cannot shout you down because your credentials are just too good and your results are good. And same thing here. You're going to shout me down? I don't care about shouting. It just makes me yawn. So I'm just going to keep saying the truth and demonstrating the truth unless you kill me, but if you kill me, then you're not a vegan. There.

[01:02:55] **Gabrielle:** Thank you so much for having me. Thank you.

[01:02:57] **Dave:** It was a pleasure.