

[00:00:00] **Melissa:** Hello. And welcome back to the sound bites podcast. Today's episode is about putting protein into perspective, myths, misinformation, animal protein, and plant-based diets, and what my guest refers to as muscle centric health. My guest today is Dr. Donald Layman. He's a professor emeritus in the department of food science and human nutrition at the university of Illinois at Urbana-Champaign and has spent his entire career interested in protein and protein research. Welcome to the show Dr. Layman.

[00:00:35] **Don:** Great to be with you and Melissa.,

[00:00:37] **Melissa:** should I call you Dr. Layman or what do you prefer? Okay. Thank you so much. I have been following your work since the early 2000s. When I saw you present at a dietitian meeting in the Chicago area on protein and specifically protein distribution in the diet, which was really new concept back then, and very, very compelling, especially myself being a certified diabetes educator.

So I've been following your work since then. And interestingly. Just a few months ago, you and I got to spend a couple of days together in Kansas because we were doing a media training with dietetic interns in two different places in Kansas. And you are speaking to the interns on protein research and it just peaked my interest again, just hearing.

Some of the new stuff that you've been discovering through your research. So I wanted to bring you on the show. I'd love for you to tell more about your background and work, especially as it relates to protein, which I know is your, your life's passion and also any disclosures you would have to note.

[00:01:43] **Don:** Okay. Um, starting with disclosures as one might suspect.

I have a lot of relationships with groups that are interested in protein. So the American egg board, uh, the national dairy council, the national Cattleman's beef association. So I do a lot of work with them and a lot of companies, Kraft, Nestle, and again, food companies that are interested in protein. So I interact a lot with those as far as.

Uh, background. My background is very basic chemistry, but it sort of has a lot of agriculture and food background. So I grew up on a farm in Illinois, so I learned a lot about plants and animals and growing up and food. I then went off

and did a BS and MS degrees in chemistry, biochemistry. And at that point I got interested in the concept of how the body builds protein.

We'll call it protein synthesis. And during my master's degree, I was working on aging, uh, which sort of has a theme that comes back later. And from there I decided I would pursue that and went off to get a PhD at the university of Minnesota in nutrition, biochemistry. Where at Minnesota, I sort of teamed up with a group of people who were very interested and knowledgeable about muscle.

So I began to sort of combine my interest in protein with a specific interest in muscle. And I kind of came away at that point with the belief about nutrition. That nutrition really is focused on two tissues in the body. Muscle and brain they're technically the only two functional tissues. Everything else is there to support those two the liver, the kidney, the pancreas, the heart, they keep your muscle running and your brain running.

And so I sort of got this muscle centric concept. Uh, nutrition or that kind of carried over from there. At which point I went off to university of Illinois, as you indicated, and spent 34 years there sort of researching protein and nutrition and how much protein do you need, how does it change during lifespan?

Uh, and also general metabolism kind of balances of carbohydrate and fat, which are ultimately the fuels for muscle. So how do we balance all of those macro nutrients? That's kind of an overview. I have a really unusual background. You know, a farm background at the university of Illinois, I was head of foods and nutrition and child development.

So I have a lot of human development background. Uh, I worked in international malnutrition, and I had a lot of work in Morocco and Northern Africa for a while. And I've gone on to sort of focus on weight loss and adult aging. And then I was actually associate Dean of the college of agriculture. So back to the agriculture background, so really diverse background from the farm gate to the plate in terms of how food impacts our health.

[00:04:48] **Melissa:** Excellent. Thank you. Yes. And when we were touring Kansas on our media and protein tour, I found out about your beginnings growing up on a farm. And I had not known that and I just really think it's fascinating. And as we go through our conversation today, I definitely want to address and, and touch on the lifespan.

Um, because you said some things. That surprised me or just, I had never heard before about, you know, how the we're going to talk all about protein, turnover and synthesis, but younger people versus older people. And of course I know about sarcopenia. I've talked a lot about protein on the podcast, um, towards the end, when we're wrapping up, I'll share some related episodes and information, but before we dive in, I did also want to ask you, since you do consult with

different companies. What do you say to people who feel that your bias toward animal protein because of the companies that you work with?

[00:05:44] **Don:** Well, hopefully not too many people think I'm biased if they actually read the research or listened to me. But, you know, I certainly understand that night. I think there's a couple of things.

People need to understand that. Well, the first one is that the federal government does not fund food research. Uh, and so the national Institute of health, if you want to study, for example, eggs and cholesterol, they won't fund that. Uh, they basically require that the organizations or the companies that have an interest in it

are the funding source for it. So we kind of get into a catch 22, if you're going to fund it, who's going to do it well, it's likely to be the company. And I just think of an example of that. We sort of had an understanding of protein back in the early nineties. And I sent our research proposals into the national Institute of health for 10 years and they turned down the grant thing.

We basically know everything we need to know about protein. There's no reason to study it. But I finally pursued it long enough that I got Kraft foods and the national dairy council and the national Cattleman's beef association to fund it. And basically that turned into the research that you now know about meal distribution and aging protein, those led to those discoveries.

So without that industry funding, we'd still be in the dark ages about protein and what we thought was true back in the seventies.

[00:07:14] **Melissa:** Very interesting. And I do have to say. Most of the feedback I get on my podcast regarding my guest experts is that my listeners are just really thrilled to hear these knowledgeable guests like yourself, um, who have spent their career studying and working very closely with the topic that I'm interviewing them on.

But I do have a couple of people reach out to me occasionally and say that. You know, they have a hard time really trusting everything that the guest says because of their potential bias and working with companies. And I get it, like you said, I get it. But we talk about this a lot on the podcast, confirmation bias and limitations inherent in nutrition research, especially epidemiology, and, you know, having worked for the dairy council for eight years, you know, I got to see inside how much science and research.

Goes on. And the information that I was sharing out to the public and even my health professional peers was just the tip of the iceberg of all of the research that I was exposed to inside the dairy council. So I'm going to get off my soap box, but I just, you know, I think it's important that we talk about these things and I appreciate you addressing

[00:08:30] **Don:** that.

Add to that. One of the reasons I ultimately left the university retired was that I realized that research we were doing was not getting to the public. And so one of the things I wanted to do, and I'll say the second half of my career was spend more time translating basic science for the public, which is something I like doing.

The other thing I would add to the bias issue, and you mentioned the dairy council. One of the things that your listeners need to understand is that the commodity group. The eggs, the dairy, the beef are under the jurisdiction of the USDA. When USDA very carefully screens everything that they say and the research they do.

However, food research that comes out of companies, Coca Cola lays potato chips. Kellogg is screened by the FTC, the federal trade commission. So as long as they don't say something illegal, Or that they're curing a disease. They can say anything they want. And so if we take eggs, for example, the USDA would not allow the American egg board ever to say anything about a highly processed egg substitute.

They just can't address it where the egg substitute could criticize eggs for having cholesterol or something. So it's not a level playing field. Then the consumer needs to recognize that that the protein world. is primarily commodity based and they're under very strict USDA guidelines as to what anybody can say about it.

So there's a screening level that the consumer needs to understand. Oh, really

[00:10:11] **Melissa:** glad you brought that up because I have done sponsored and non-sponsored episodes on the podcast with a lot of commodities. I call myself, I'm kind of a commodities girl. I preferred that over brands. You know, having worked for the dairy council and then consulting with beef.

And, um, my listeners know I've done a lot of avocado centric episodes, and that's also a commodity that is highly scrutinized by USDA. And, um, it's not something I mention often on the podcast, but like I said, whether it's a sponsored episode or not, All of the content that we touch on, talk about on the podcast that goes in my show notes.

And sometimes even the social posts all have to go through USDA approval. And, um, yeah, I haven't really told people about that. So thank you for clarifying. Some of that. It does get very complex. So let's jump into all things, protein. We're going to talk about your research and what you shared with the dietetic interns is a lot of what I'd like you to share with my listeners today.

And I've lined up some questions and feel free to add in anything that you think is important that I haven't touched on. You mentioned that you have been focusing on translating research and let me tell you you're very good at it. And one of the things that you said was we've had a plant-based diet recommendation for over 40 years.

So I'd love for you to talk about that because it kind of helps us set the stage and think about things a little bit differently.

[00:11:41] **Don:** Yeah. I think that the great point, um, a lot of your listeners I'm sure are familiar with the food guide pyramid. And if you look at that and what people are eating, and then look at the NHANES data, uh, most Americans are getting about 70% of their calories.

From plant-based food and only about 30% from animal-based food. So we already have a plant-based diet. And for 40 years we've heard cholesterol was bad for us, which we now know isn't true, but we should avoid. You know, dairy and eggs and meat and things like that. And people actually did that. They started eating a lot more grain-based things, but if you look a little deeper at those 70% of the calories that are plant-based, which you find out is something

a little over 50% of those are added sugars, oils, and fats that come from plants and plant oil.

And another 30% are coming from highly refined grains and sugary cereals and things. And so if you look at that, plant-based part of our diet, 80% of those calories. Aren't very healthy. They're basically empty calories. And so a statement I like to make all the time is we don't really need a more plant-based diet.

We need a diet that has a better plants. Yeah.

[00:13:05] **Melissa:** I love that quote from you. It's really important to have that perspective. You know, I talk about nutrient rich foods all the time. And to your point, if such a large portion of our diet or more of these empty calorie foods, we've got to switch that over and focus on nutrient rich.

You also said. Um, something that I'd like you to share about the number one, two and three vegetables in our diet?

[00:13:28] **Don:** Yeah, I, I mean it, back through the 2000, 2010 dietary guidelines, people were looking at plant-based diets and they were looking at the quality. And as you said, the quality of the American diets, not too good because of snack foods and junk foods.

And basically when they looked at it, what they found out was potatoes. Primarily French fries are the number one vegetable in the American diet. And number two turns out to be tomato sauce, primarily on ketchup and pizza sauce. And number three is lettuce. So less than 25% of people are getting three servings of vegetables per day.

And the vegetables they're eating have very little nutritional value. So the reality is we're not eating broccoli and avocado and healthy plants. We're eating highly processed grain products.

[00:14:24] **Melissa:** Right. And recently did an episode on defining quality carbohydrates and it was sponsored by the potatoes USA. Um, but we do know that potatoes are a nutrient rich vegetable.

However, when we were looking at French fries being the number one vegetable. You know, we've got to take a step back at that. So let's dive into

protein. I want you to give us the 4, 1, 1 on protein growth versus repair and replacement, I think is, you know what we're talking about? Protein turnover.

[00:14:57] **Don:** Yeah.

Um, you know, for years I think we were kind of in the area where everybody felt protein was primarily for children and clearly Children need protein for growth, but the more we understood about that growth is actually a very slow small process. If you take a 10 year old or a 16 year old at their maximum rate of growth, they're only depositing about five to seven grams of new protein in their body per day.

But if you take somebody of the same weight, say a 16 year old, compare it with a 65 year old. They both need to replace somewhere between 250 and 300 grams of protein in their body every day. That's the repair and replacement process. So everybody has this continuous process of proteins becoming disrupted or abnormal or needing to be replaced.

Every day and that's throughout life. And when we were growing, the difference for growth is pretty small. And what we discovered was this repair and replacement process becomes less efficient as you get older. And we think that's part of the aging process, sarcopenia, osteoporosis. Why as we get older, are we not as strong as our bones, our muscles, uh, we think it's this repair and replacement process.

And so that kind of where our research began to

[00:16:26] **Melissa:** focus, that makes sense. And for the listeners who don't know sarcopenia is that muscle wasting or muscle loss as we age. I my understanding it can start as early in our thirties. Uh, but I don't remember the specifics.

[00:16:40] **Don:** Most people say it starts becoming measurable around 40.

We did some research, uh, with a population of, uh, women who were in their mid thirties. I think the average age was 37. And you can begin to pick up some of these metabolic changes, but most people look at muscle loss that sarcopenia with aging as something around 4% per decade, starting in your forties.

[00:17:07] **Melissa:** Right. And we know, and I think we're going to touch on weight management, but we know with that muscle loss that can contribute to

weight gain and correct me if I say anything wrong, but that's my understanding. And that's also, uh, we know that we need adequate skeletal muscle for stability and for our daily activities of life, you know?

So there's a lot of concerns wrapped up with this muscle loss, right?

[00:17:35] **Don:** Yeah. So muscle is one of our metabolically, most active tissues. And it's one that sort of voluntary. You can kind of choose to make it more active or not your heart and your liver and kidney kind of run involuntarily. But your muscles actually are more voluntary.

And we now know that a lot of our metabolic outcomes, whether it's blood sugar, Insulin sensitivity, blood lipids all relate to muscle health. And so maintaining your muscle is very important than if it declines, then you're losing metabolic tissue. Uh, if you keep eating sort of the same thing, then you're going to accumulate fat.

And so that transition that you were kind of talking about, uh, is sort of the combination of muscle being less healthy. And eating too many calories for your age, depositing

[00:18:29] **Melissa:** fat, right? And the understanding is that for muscle health, we need activity and you can talk more specifically about the types of activity.

Um, and we also need protein. And we're going to talk mostly about the diet. So I'd like to hear from you about how much protein your research is showing that we need. And I know that there's kind of a, an update on the current science with regard to the distribution of that protein, but also the quality, because you said some things in Kansas that really piqued my interest, um, that I want you to share with the listeners.

So how much protein are we looking at?

[00:19:09] **Don:** So the current. RDA for protein is 0.8 grams per kilogram, body weight, which translates into. Sort of around 55 to 60 grams per day, what's important to recognize is that's the minimum amount to not see deficiencies, it doesn't necessarily mean the healthy amount. And I would use an example of another nutrient vitamin C for example, we know the

RDA for vitamin C is 60 milligrams per day, which prevents scurvy the deficiency disease, but probably in the last year, half, the people in United

States have been taking vitamin C supplements for immune response to COVID and those levels might be 500 milligrams per day or a thousand milligrams. So they're taking 10 times the RDA.

For a specific purpose and we need to think about protein and the same way you can probably get along, especially when you're young at 0.8 grams per kg. But most of the research now shows that adults for health really need to be above one. And most of the data suggests between 1.2 and 1.6 grams per kg, which is about twice the RDA.

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[00:20:24] **Melissa:** remember several years ago, I did, uh, this 30 day protein challenge. What does that translate into as far as like a, an average amount of grams of total protein that a person might need?

[00:20:35] **Don:** Obviously it relates to body weight cause some extent, but we use. I usually say that the range you ought to be looking at, I said before the RDA sort of around 55 to 60, the range people should be looking at is between 90 and 160 and that obviously relate to body weight.

Like small woman would be on the low end of that scale and a larger male on the high end. But that's kind of the range when we're doing weight loss. When we're talking to adults for health, we always target being above a hundred grams per day as the target

[00:21:11] **Melissa:** for health. Yes. And I remember asking you, do I really need a hundred grams because I know from my 30 day protein challenge and just some tracking that I've done over the years, Even though I like animal protein and I eat a decent amount of protein.

I can get like 80, 85, but that hundred is a little elusive. And you said, yeah, Melissa, you need a hundred. So I'm working on that. Um, and actually what I think I might do is. Record a little outro to add onto the end of this podcast episode. That talks a little bit about how I do that in certain products that I like so that I won't get off on a tangent

here.

[00:21:50] **Don:** I agree. Yeah. I, you know, I understand that. And we, in all of the studies that we did at Illinois, we found it very difficult to keep women

Above a hundred grams per day. But what I would also add is we found significant metabolic changes if they drifted down from that. But we thought the hundred. 95 – 100 was a pretty important line.

one of the subset for that. And really where my research came in is we were studying the regulations, the protein synthesis. We think that protein synthesis is really the key to maintaining muscle health. And as we studied that, we realized as you get older, Your efficiency of that repair and replacement process goes down and it goes down because of how the body regulates protein synthesis.

When we're young, the body stimulates growth, stimulates protein synthesis by hormones. Uh, children grow because of hormones, but after we stopped growing in our mid twenties to 30, uh, now we shift the diet quality. And what we realized was that. The amount of protein it takes to stimulate that system goes up over time.

So adults actually need more protein than an equal body weight child would because they're less efficient. And we finally found out that the reason for that as a specific amino acid called leucine. Which gave us a whole new insight about diet quality. And from there, we learned that to get enough protein to stimulate muscle protein synthesis.

You need about 30 grams, a minimum of about 30 grams of protein at a meal. So I hence three meals, 30 grams of protein, 90 grams per day. That's kind of where all those numbers come

[00:23:44] **Melissa:** from. Right. So I kind of envisioned it as, you know, you need that 30 gram Load to flip that switch on. I want to hear more about the leucine, but before that talk about this, you know, ideal range and window.

I remember you saying like back when I saw you present in the early two thousands, you kind of had the suggestion of, of doing. 30 grams at breakfast, 30 grams at lunch 30 grams at dinner, and then some extra with snacks or whatever. And by the way, the whole concept being, most people don't get nearly 30 grams at breakfast, but.

Most likely get more than 30 grams at dinner and sort of, kind of re distributing that through the day. So talk about that a little bit.

[00:24:27] **Don:** Yeah, exactly. You know, I think we did those experiments initially in rodents where we can do the mechanistic work. And then we did the

human study along with a colleague Doug Paddon Jones at university of Texas Galveston.

And unfortunately when we did the study, uh, we decided to use 90 grams per day. And we did the sort of American uneven distribution with 60 grams at dinner and 10 grams at breakfast, kind of the way Americans eat. And then we did 30, 30, 30, both had 90 grams. And that worked. We found that the distribution actually with the same amount of calories and the same amount of protein, the adults made more protein per day, more muscle protein per day.

So we proved the point. Unfortunately, everybody. Locked onto that study and fed well, the even distribution is the issue and it's not the way you said it initially was there's a threshold for the trigger for protein synthesis, and that is associated with. The amino acid leucine. And it takes somewhere between two and a half to three grams to stimulate that, that sort of turns on the trigger.

And that's kind of where the 30 comes from, but we know that you benefit your body in many cases by a higher level. And also the quality of the protein matters. So for example, you can get two and a half grams of leucine with 23 grams of whey protein, but it takes 33 grams of soy protein and it takes 40 grams of wheat gluten.

So proteins aren't all alike. You can get the amino acid from any of the proteins and you'll often get. Products say, well, it contains all the essential amino acids, but what people need to understand is they're not the same proportions. And some of these key amino acids, like leucine are fairly low in most plants, particularly grains.

And so, uh, again, we sort of took an average of American diets. Which, if you look at the amount of protein in a meal about 8% of that will be leucine. So 30 grams translates into 2.5 grams of blue sane. So that's again, where all those numbers come from. It's how much protein does the average consumer in a normal American meal need to have to get this leucine trigger.

Okay. And as you pointed out, the real key meal then is breakfast and reason for that is, and we all know, you know, everybody who does protein research knows that during an overnight fast, from dinner to breakfast, they may have a 12 hour period where you're fasting during that period. Your. Muscle becomes what we call catabolic it starting to break down protein to supply amino acids, to other organs like the liver or the brain or something else.

And so until you have enough protein to sort of trigger muscle. It stays catabolic. It continues to break down and we think that's part of the aging process. And so by redistributing the protein from dinner to breakfast, now we can sort of correct the system. We can make it. In fact, catabolic, we can make anabolic and start repairing and replacing protein right away in the breakfast, as opposed to waiting clear till dinner.

[00:27:53] **Melissa:** Very interesting. And it sounds like we don't really need to worry too much about counting grams of leucine. If we're getting 30 grams of high quality protein, which you're going to talk a little bit more about exactly. So if I have the typical breakfast and maybe I have 10 grams of protein and maybe a chunk of that as plant protein, my body's not even.

Using that right.

[00:28:16] **Don:** Well, that's not quite true. Um, your muscle can't use it. So your liver or your GI track and sort of other lean tissues, will use those amino acids, but it's not enough to protect your muscle. And we know that. And the aging process. Uh, it's really the muscle that we have to worry about protecting, okay.

Earlier we talked about this 250 grams of new protein. The body has to make per day. Well, 75% of that is organs. It's the kidney and the liver and your heart. They get first priority because if they're not being protected, you die right away. Muscle while, it makes up 50% of body protein only gets 25% of this daily turnover.

And it's much more specific. It's much more dependent on the quality of the diet to be sure we protect it. And so we've got this sort of immediate need for Organs versus the long-term need for aging. And that's where all of this protein research is focused is how do we protect the aging process?

[00:29:23] **Melissa:** Okay.

So I know you also like to say, you know, you'll say breakfast, but then you'll say, or whatever your first meal of the day is, uh, you know, some people don't really eat breakfast, but to your point, the earlier you can get that protein load The quicker you're going to switch from catabolic to anabolic.

[00:29:43] **Don:** Exactly. So in the worst of all world, there's only having one meal like at dinner. So at seven o'clock that the effect of a meal on muscle

protein turnover on muscle health only lasts about two hours. So if your only meal with adequate protein is dinner, that means you're spending 22 hours a day. In this catabolic state breaking down muscle and only two hours in the anabolic state.

So what we want to do is spread that out. We want breakfast as soon as your first meal, as soon as you want to have it, we want to get you anabolic. Now, instead of just two hours, we have the potential to spend eight hours or something in an anabolic period. And you know, if you translate that into.

Weightlifters, you know, bodybuilders may very well go to four meals per day. They want to keep adding these anabolic two hour periods. Um,

[00:30:38] **Melissa:** now it makes sense. Maybe this is a good time to ask you since we're talking about timing of meals and having more hours in the anabolic phase. So that begs the question.

What you think about intermittent fasting, fasting in general.

[00:30:56] **Don:** Fascinating again, is an age issue. I think that a 20, 30 year olds can fast, pretty healthy. That's why, uh, the military uses 20 and 30 year olds because they can go out in the field with severe food restriction and come back and be perfectly healthy.

But we've already talked about adults and if they get beyond 40 now we're into. What ultimately is the catabolic period. I don't think that adults beyond 40 should ever fast. We know from studies of bedrest, we know from studies of starvation, that if you compare a 20 year old with a 60 year old, Uh, say for example, bedrest, a 60 year old will lose three times the muscle mass in a week that a 20 year old will lose and they won't regain it.

And so the problem with fasting for adults, people over 40 is that it tends to be a negative process. Uh, so anything, any ideas that it somehow has a cleanse or making your metabolism more efficient Simply isn't true. It might work for a 25 year old, but it won't work for a 60 year old. So I don't like fasting or starvation kinds of things.

On the other hand, there is something known as time restricted eating where you simply shorten your eating periods to a smaller part of the day. And that's why, you know, your comment earlier. I kind of not try to use the word breakfast

meal. Uh, if you want to use a time restricted eating, for example, not having your first meal till say 10 30 or 11 in the morning.

Uh, and only having two meals per day as a way of controlling calories. I'm totally on board with that. I think that's perfectly fine. Um, the other variable in this, you touched on earlier is physical activity, the more physically active you are, the more flexibility you have. If you're highly sedentary, then your meal pattern needs to be even more

Carefully planned. And I would say more of the three meal per day with more distribution.

[00:33:05] **Melissa:** Right. I remember having this conversation with you and it seemed a little counter-intuitive at first, but it makes sense when you really think about it, the more active a person is, especially if they're doing strength training, you still need the 30 grand protein load to flip that switch.

But because you're doing the activity, it's using the protein more efficiently. Okay.

[00:33:29] **Don:** I would suggest to your listeners to try and think of it as a U shaped curve at the very low end of exercise, your protein needs go up because your muscles pretty inefficient for a sort of normal activity in the middle.

It's kind of a lower level. And then if you're trying to be a super athlete, again, really high intense exercise, your protein needs go up again. It's kind of U shaped. Interesting without getting into too much mechanism, this regulation in muscle that I've mentioned leucine, uh, there's actually a variety of things.

The muscle is looking at it's integrating signals and it's integrating a signal from exercise, particularly muscle stretch, resistance exercise with protein and hormones like insulin. It's integrating all these signals and if you have a good exercise signal, You actually need a little less leucine to make it work.

Okay. Uh, one of the pieces of research that has been done quite a lot is that, uh, I just argued about 30 grams for breakfast. So most people aren't exercising when they wake up in the morning. But if you look at protein right after exercise, We know that between 15 and 20 grams of protein, will turn on muscle protein synthesis after exercise.

So that's a good example. That exercise makes the system more sensitive.

[00:34:54] **Melissa:** Very good. Very good. So back to the intermittent fasting, just real quick. So if you're shortening your window of eating, you're lengthening that window. Of being in that catabolic state. So how does that

[00:35:09] **Don:** work? And so you're talking about trade-offs here and the issue is what's your bigger issue?

Is it obesity or is it muscle loss? And so what you're doing by shortening your time restricted feeding is you're kind of getting a compromise there. You're trying to maximize your first meal and your last meal. Breakfast and dinner, you're kind of eliminating your lunch meal, uh, and you're now reducing your calories.

So that's kind of a concept we used in weight loss. Uh, and now you're trying to get the most efficient outcome for muscle but with the least calories. Uh, and so you're kind of balancing that again, if you're a weight, a bodybuilder or weightlifter, you probably want maximum distribution. I know weightlifters who set their alarm and wake up at three in the morning and take a protein shake.

Wow. So now you're trying to expand that anabolic period. So again, it's, you're always looking at a balance between protein and muscle health and calories and obesity, and that's why you sort of could do that. One of the other things we've talked about, this even distribution, what we know for a hundred percent sure is that, that first meal and the last meal, affect protein.

To my knowledge, there has never been a study of lunch. So that first study that Doug Paddon Jones and I did with an even distribution, uh, I think the effect is all of the first meal. I think that, again, as I said, your meal only gives you a two hour effect. So whether that two hour effect occurred at seven in the morning, or whether it occurred 11 in the morning, I don't think it matters.

Again, there's this two hour window with a meal that your anabolic, your absorptive. And so again, if you have your breakfast at seven, your absorptive from seven to nine, your anabolic, or if you have at 11 it's from 11 to one, it's still only two hours. So I'm not sure there's a

[00:37:05] **Melissa:** difference. Yeah. That's interesting.

[00:37:08] **Don:** Bob Wolf and a couple of other people have done some studies kind of supporting that, but why. To my knowledge nobody's ever looked at launch. We're just assuming that the important, but nobody's ever studied it.

[00:37:20] **Melissa:** Right, right. Interesting. Okay. So what else do we need to know about leucine? And I know there's some other amino acids you might want to touch on and then really being clear about animal proteins versus plant proteins.

I really want to hear more about that.

[00:37:39] **Don:** So as we've gotten into this, you know, adult need for protein, uh, we now know that the protein quality makes a bigger difference. And as we raised the question. About plant-based diets or vegetarian diets. One of the things that we know is that almost all vegetarian diets result in lower protein intakes.

If you look at vegetarians that have been studied, most of them are down around the RDA, uh, 50 to 60 grams of protein. It's very hard to have a vegetarian diet with a hundred grams of protein, unless you go to ultra processed foods. Uh, isolated proteins like soy or pea or something built into foods, uh, which is possible.

But again, you know, are you looking for more ultra processed foods in your diet or not? So as people think about a plant-based diet, all plants are limiting or they're low or deficient in. One or two of the essential amino acids and the ones that are most critical are called methionine, lysine And I've been talking about leucine the third or fourth one might well be tryptohpan.

Um, methionine is always limiting in uh, legume type products. So Pea and soy, uh, lysine is always limiting in grain products. So, uh, corn and wheat and oats, and. Lucene is particularly limiting in grain products. So as we go to lower protein with a typical American diet where Americans are eating around 80 to 90 grams per day, uh, actually women are around 70 and men are around 90, uh, we tend to be above the requirement far enough that our mixture of plant animal doesn't matter, but the animal products are providing about 70% of our protein.

In that mixture. So as we begin to shift to the plant side, now the quality will make a lot more difference than for example, I mentioned earlier, if we're looking at leucine for whey protein, we can get that amount with about 23

grams of protein. If we're looking at egg protein, it's about 27- 28. We're looking at soy protein.

You need 33 wheat protein or keenwah you're up in the forties. So again, you can get it, but it takes a lot more protein and unfortunately, most vegetarian diets Tend to push it down. So that's something that the consumer needs to know if they're going to make those choices. So one of the things I always like to use it as an example is wheat cereal, which is deficient in lysine.

If you take an average wheat cereal say raisin bran, a half cup serving has about six grams of protein. Uh, no, I think it's four grams of protein and you combine it with six ounces of milk. Uh, you now have a balanced protein, amino acid protein with 10 grams, but if you do the same thing with a soy drink, four grams of protein from the wheat cereal, it takes over 30 ounces of the soy milk to get up to the lysine number.

Not very many mothers that are feeding their kids, uh, soy or coconut milks or things realize that, that they simply are giving them an imbalanced protein for breakfast.

[00:41:18] **Melissa:** Right. And that's because of the bioavailability, correct.

[00:41:21] **Don:** Just because it has no lysine in it, isolated soy products. Um, uh, it's not really an issue of bioavailability.

It's the fact that it has very low lysine. Okay. If you're talking about natural products like beans, Now you're getting into bioavailability in most grains and in beans, the bioavailability of the natural product is only between 40 and 60%. So, if you looked at a whole grain cereal, for example, that the wheat cereal, it might only be 40, 45% available.

So if you think you're getting 10 grams of protein, you may actually only be getting four or five.

[00:41:59] **Melissa:** So a practical takeaway from this for our listeners would be

[00:42:03] **Don:** what I think the practical takeaway is that your best, having a combination of plant and Animal proteins, if you want to have more plants. That's great, but keep your total protein high, that hundred grams.

We talked about your okay, but if you shift to a vegetarian diet diet that gets you down around 55 grounds of just plant proteins, you're going to be deficient in some amino

acids.

[00:42:33] **Melissa:** Okay. And so also was curious, what do you say to people who claim. Everybody eats too much protein. I know you touched a little bit on the RDA and such, but I didn't point blank ask you that question yet.

[00:42:47] **Don:** Yeah. I mean, if you look at the NHANES data, uh, again, the RDA is 0.8 grams a day, the average American men and women fall into about 0.9 to one. So we're just barely above it. But if you start looking at age, uh, again, based on NHANES 40% of women, Age 60 or older are actually below the minimum RDA they're suffering from Protein deficiency.

And so how far can we push that down? We've got the majority of adult women are very close to the RDA now and changing their diet composition to more plant-based is a real risk. We don't know the ramifications of that. And just start talking to the average consumer about protein quality. Uh, that's a pretty big ask.

I mean, the average consumer doesn't realize nine essential amino acids in the right proportions. I, you know, I like to talk about protein as a little, like a vitamin pill everybody knows that. You don't really take the vitamin pill, because you need the pill, you need the 12 vitamins inside of it. But when we start talking about protein, we just say, well, it's protein.

But actually the issue is there's 20 amino acids in that protein nine of which are absolutely essential in our diet every day. And the average consumer has no knowledge of how to balance

[00:44:11] **Melissa:** that. Yeah. That's a great way to explain that. Thank you. What else do you want to share with us about protein, quantity, quality meal distribution?

Um, I know that we've covered a lot, but is there anything that is important that I haven't asked you?

[00:44:29] **Don:** I think we've covered quite a lot. I think maybe just to go back and reiterate a couple of things. I think that. What we know for 100% sure is that first meal of the day, is important for muscle health.

And we would like to see people get into at least the 30 grams range for that. I think having a larger dinner is okay. We usually think of the sort of responsive range for protein is somewhere between about 25 grams and 55 grams at a meal. So eating more than 55 makes no sense at all at a meal. Having a 16 ounce steak makes no sense at all.

Uh, but getting up to 50, you know, for a meal per day, especially for larger individuals is probably fine. And that the least important meal of the day, it is perhaps a lunch. Uh, we just don't know much about that. So I always talk about that first meal and the last one. Are your important protein meals and the first one, you need to get it.

And both of those need to be above

[00:45:34] **Melissa:** 30. Great. Thank you. Normally, I wouldn't ask about animal proteins impact on the environment for somebody like you, but since you spoke to that quite a bit in Kansas. I would like to have you share some of that. I have a lot of episodes on, on this topic and I'll share those out as we wrap up if people are interested in more information, but, um, yeah, I would love for you to address that.

You know, what do you say to people who say that, you know, animals are bad for the environment.

[00:46:04] **Don:** I always try and take a, you know, there's the pure animal husbandry part, you know, animal existence. I tried to take a nutrition approach to it, which is protein. Um, the animal proteins are very important in our diet. And trying to replace those is not an easy thing.

The other part of that from an agricultural standpoint, is there are huge tracks of land in the United States that are only available for raising animals, particularly ruminant animals have a very unique role. You know, cattle for dairy, for milk, or for meat, have a very unique role because they can eat forages and they can basically take grass and turn it into high quality protein, which humans can't do.

And basically no other animals can do so that the part of our food system that we can't lose. The other thing to realize about the United States is we're

basically. Uh, Northern climate country. Uh, we basically have a full agricultural aspect and we can't change the grassland as you and I saw in Kansas or out in Oklahoma into raising avocados and broccoli.

They're designed for grazing cattle and raising wheat. Uh, it's important for people to know that if we're going to have a healthy plant diet that already 50% of our fruit. And twenty-five percent of the vegetables consumed in the United States are imported. And the number one cause of climate change in the United States is transportation.

Primary source of greenhouse gas. So if we're going to not simply shift to more refined grains and sugar, but actually having a healthy plant diet, it's all going to have to be imported. And the climate impact of that is far greater than raising cattle. Uh, the last thing on that, Uh, one of the things I like to think about is that if you look back in the 1800s, we have the same number of cattle in the United States today, back then we called them Buffalo.

We had about 90 million best guess, and today we have about 90 million domestic cattle. So basically it's really hard to argue that cattle have anything to do with climate change haven't really changed in 200 years.

[00:48:21] **Melissa:** Very interesting. Thank you. I appreciate that. So I mentioned I have some related episodes.

I'd like to mention what they are and I, of course, I'll put all of these links in my show notes at sound bites, R d.com. Talk about protein a lot. So it's sprinkled throughout. Many of my 200 plus episodes, but some specific ones that listeners might be interested in my very first episode, episode, number one was the power of protein with your fellow researcher, Doug, paddon Jones.

And then, uh, episode number 39 with your fellow researcher, Stuart Philips is protein and exercise. Partners in successful aging. So we talk a lot about the sarcopenia in that episode. And then I mentioned the 30 day protein challenge. I have a few episodes on that and some blog posts that was several years ago, also with regard to animal protein and sustainability or the environment I had Dr.

Frank Mitt learner on an episode, 143, talking about greenhouse gases in agriculture. That is an episode not to miss a episode 171. I talk about seafood sustainability. Uh, episode 188, talk a lot about, are we eating too much meat and then some more beef and environment episodes. 104 and 144. So check

those out and also, um, stay tuned to the outro for this episode, because I will be sharing more information.

Like I said about how do I try to get to a hundred grams of protein a day? And some of the products that I like to use to help me do that. I'm not working for any of those companies. It's not sponsored, but if you're interested, I have found what works for me. So thank you so much for being on the show, Dr.

Layman, is there anything else that you wanted to say in

[00:50:01] **Don:** wrapping up? No, it's my pleasure to join you. And, um, you know, I think that the work that you do and the information you present to people, uh, you're bringing leading researchers. I mean, Doug, paddon Jones, Stu Philips, Frank Mitloehner. I mean, these are the leading scientists and people want to know where to get the information, who to believe.

Uh, you're doing a great job of bringing the right people to the public, to hear the actual research and hear, you know, really the truth behind the stories and behind the headlines that you may see in the paper. So, you know, I think you need to be commended for what you do and bringing it to the public

[00:50:42] **Melissa:** Oh, thank you so much.

And you know, it's been a long time coming if you've been on my guest list for a really long time. So I'm just thrilled that I got to do some work with you and spend two days picking your brain. And I'm really excited. I meant to mention this earlier, but I wanted to tell you that I was so inspired by you and reigniting this protein

conversation that I finally got back to my strength training in early November. I hadn't been able to do it consistently because of several injuries, my shoulder, my hand, uh, lots of things going on there. And I finally got back to it regularly and I'm loving it. I feel so good. I feel so strong. And so.

Really excited and I wanted to let you know

[00:51:26] **Don:** yeah. The muscle part is important and you know, a lot of people hear exercise and strength training, and they think, you know, bodybuilders in gyms. And I think it's important to recognize that for the average person, a stretch is very important to that process.

Well, we did some weight loss study that Illinois, where we just did. Nautilus type machines with no weights on them. Going through the range of motion for a lot of adults is a major part of it. So yoga Pilates stretching. Uh, those are where to get started. If you want to add weight to it so much the better, but don't be intimidated by the idea that you have to go to a gym to protect yourself.

[00:52:08] **Melissa:** Great points. My listeners know that I been lifting at home for decades, so I have my own little free weights but I just got out of physical therapy. So stretchy bands are top of mind for me too. So yeah, you don't have to do the free weights. You don't have to do the machines, get some stretchy bands. And like you said, just doing the movement itself.

That's a really great point. Thank you. Yep. Great. Well, Don, where can people find more information about protein research? The work that you're doing? I know you're on Twitter at Don layman, but is there anything else you wanted to share with

[00:52:41] **Don:** us? The Twitter? I don't do a lot of it, but I definitely focus on actually protein knowledge.

And so hopefully people follow me. Uh, realize that I'm trying to give really accurate information. One of the things I'm excited about though, is we're just about to launch a website. Uh, I think it will be under a heading of metabolic design, but, uh, we're going to launch a website, talking about protein requirements and protein metabolism and some of the weight loss studies that we did at Illinois.

Hopefully, uh, that'll be out in the next couple of months. I will certainly announce it on my Twitter when we start doing that. But if people are interested in following me and learning more about protein, uh, hopefully that'll be a good source for people.

[00:53:28] **Melissa:** How exciting. Yeah. And I'll stay connected with you.

And I'll add that link to my show notes@soundbitesrd.com as well, once it's up and running. Thank you. Well, thanks again. And for everybody listening as. Enjoy your food with health and mind and some protein till next time.

Hello, again, as I mentioned during the episode, I wanted to share some tips and products with you in the outro here. And I would love to hear how you try to

boost or modify your protein intake. So please leave a comment at the bottom of the show notes page or connect with me by email or through social media.

I've been interested in protein for about 20 years now, but much more focused on it in the past 10 years or so. I've done this 30 day protein challenge a few times. And in addition to that, I've tried a lot of different foods, products, meal patterns. And other tips and tricks to get my intake to go beyond the 80 grams or so that is fairly doable for me.

I should say. It's fairly doable. As long as I'm paying attention to protein, I'm sure my intake as much closer to 50 or 60 grams per day, if I just kind of eat whatever I want without making sure that I have more than two meals and that protein is a priority. So here are some of the ideas I wanted to share with you. First of all,

I'm not a big fan of smoothies, which is odd because anyone who knows me knows that I really love my beverages Well, luckily for me, since I'm not into smoothies, whey protein powder is easy to mix with water. It dissolves well and it tastes great.

So I just mix it with water. The kind I use is optimum nutrition. 100% whey, which is a blend of whey protein, isolate whey protein, concentrate, and whey peptides, plus some natural and artificial flavor, including sucralose and a sulfate. I really like the vanilla ice cream flavor. One scoop is 120 calories and 24 grams of protein.

Based on what I learned from Dr. Layman, I'm using it after exercise, or sometimes as a quick and easy breakfast, but I'm doing a little bit more than one scoop so that I'm getting closer to like 30 grams of protein. I also love Fairlife brand milk, their core power high-protein milk shake and their Fairlife nutrition plan shake, which is very similar to their core power beverages, basically their milk is ultra-filtered. So it provides more protein and calcium than regular milk. So it's 13 grams of protein per eight ounces versus eight grams that regular milk provides. And versus one gram that's something like almond milk provides, and none of these products contain lactose, even though they're all made with real milk.

It's part of that ultra-filtered process. So it's really nice to have real milk without the lactose, just in case you have lactose intolerance issues.

So I've been using core power for years now, and I just recently noticed this new product, this Fairlife nutrition plan. When I was at Costco a month or so ago, it's very similar to core power.

Core power has 170 calories and 26 grams of protein. And it comes in a variety of flavors, including the Nyla chocolate banana strawberry banana. And there's also, um, an elite vanilla with 42 grams. I don't really use that one. Oh. And the core power beverage is in a 14 ounce by. The fair life nutrition plan is in an 11.5 ounce bottle, and it has 150 calories and 30 grams of protein.

So I really like that because, you know, as we talked about on the podcast episode with Dr. Layman, we're really aiming for that 30 gram dose or load. So I really like this, this new Fairlife Nutrition Plan. Oh, and the flavors that this comes in is chocolate, strawberry, vanilla, salted caramel and coffee. The ones that I bought at Costco were chocolate.

And when I just went back the other day, they had the salted caramel. So I got that and it is yummy. What I especially love about these two. Shakes. If you will, there, they call them shakes. Is that not only do they taste great, they're really light. They're not heavy or thick. So if I'm not especially hungry or I just need something to hold me over, it's just right.

So a couple of other simple things that I like to eat. I love cottage cheese with sunflower seeds. You can do low fat cottage cheese. One cup, um, is about 26 grams of protein and a tablespoon of sunflower seeds adds another four grams of protein.

And I also love using canned tuna or canned salmon as a quick lunch either, you know, mixed up, um, with a little bit of mayonnaise and put on bread or crackers or topped on a. Oh, and I'm not a big fan of bars really, but I do like to have them on hand just in case, or especially when I'm traveling. So my favorite is called the think bar. Those come in 10 gram or 20 gram options and Quest bars are pretty good too. So those are a couple of options that you might want to check out. So again, I would love to hear how you boost or modify your protein intake. What some of your favorite foods or products. So drop me a message in the show notes or connect with me by email or social media.

Thanks again for staying tuned for this bonus content in the outro. And I look forward to sharing another episode with you soon until then take care.

