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Sun, 2/28 5:26PM 59:52

SUMMARY KEYWORDS

arachidonic acid, omega, people, fish oil, work, epa, diet, fat, membranes, fatty acids, animals, study, omega threes, minnesota, eating, fish, grams, bit, hibernating, produce

SPEAKERS

Michael Nelson



Michael Nelson 00:00

Hey, it's Dr. Michael Nelson here back with another flexure diet podcast for you. And today I have a very special guest, my good friend, Dr. Doug, whenever I have questions about omega three, or fish oil testing, or pretty much anything on the history of omega threes essential fats omega six, Dr. Doug is my go to person in that area. I first met him at the ISIS and conference International Society of sports nutrition almost a decade ago, and I've been using his omega three test with my online m three clients pretty much since that time. And it's been extremely useful. So you want to listen to the end of this podcast, I have a crazy offer that he has on the omega three tests, which is great. And in this podcast, we talk all about omega three fish oil, from their use in native cultures, in US Eskimos and even some new stuff on possibly reducing the risk for COVID. So we go across the whole spectrum here on omega three, which is a question I get a lot about fish oils. And I still see some people who are lower on fish oil. So even if you're using it as a supplement, probably still worth listening to this podcast, which is brought to you by the flex diet certification, go to flex diet, calm, FL exdt.com you'll be able to get on to the waitlist there, which will put you on the free newsletter. And we'll let you know the next time that that opens up. We've got a whole section in the flex diet on essential fatty acids, the role of omega three, omega six, what do you need to know about fatty acids and lipids themselves, and even a little short version in there about some of the testing. So enjoy this podcast with my good friend, Dr. Doug. Hey, what's going on? I'm here today with my good buddy. Dr. Doug, how are you today, sir?



02:16

Hey, great, Mike. Nice to see you.



Michael Nelson 02:18

Yeah. Good to see you again. I know you're you're holed up here in Minnesota too. And surviving the cold. So that's good.



02:25

My electrons are still moving. So



Michael Nelson 02:27


yeah. Always a positive. Pretty cool. Yeah. So reboot may not know you do want to give us just the the short background there because you do a lot of very fascinating stuff with omega three testing, lipid testing, consulting, we're talking about some consulting stuff with military personnel, industry, all sorts of stuff.





02:49


Yeah, I work. I work with fatty acids and lipids and then trained at the University of Minnesota with a guy named Ralph Hallman. He's the guy, the term omega threes and, and really inspired me to get people to eat omega three fats. So I've been on a 30 plus year quest now. To do that, I have a small company called lipid labs. And we do fatty acid testing and consulting for food and pharma. And we have this omega three blood test that we offer to that's a way of assessing fatty acid status. done a lot of different types of research, you know, lipids are really involved in so many different avenues of light. So, we are other lab, there's a lot of work with pharma companies that produce drugs, protein based drugs with fermentation. So the fatty acid cocktail that goes into making those proteins is really important. How well that that biomass grows. So that's actually a big part of what we do. So if you can get up 10 or 20% efficiency in a bioreactor that's worth several million dollars. It's a Yeah, you know, financial advantage. But yeah, we've worked with I helped develop omega three eggs a long time ago. They're working on so for food indications, omega threes, I put we got flaxseed into pet foods and started looking at omega three metabolism and dogs back in the 90s. So that kind of ushered in the, the craze of using long chain omega threes for pet foods, so particularly proud of that. So but yeah, I'm still not familiar with the University of Minnesota. It was a longtime employee


there and run a private company now and just loved chatting omega threes and, and keeping people healthy and, and we work with the broad spectrum of folks. So good to talk to you today.


 Michael Nelson 04:45
Yeah, yeah, we first met I think 2010 is


 04:52
the right meeting. Yeah, it was a great meeting. Yeah,


 Michael Nelson 04:55
yeah. Yeah, that was fun.

 04:57
I think I saw you out running it. It was awesome. I'll be the first

 05:00
Yeah.

 05:04
Yeah.

 05:05
But yeah, that was a great meeting. And yeah, a lot of like minded people there. Which was really cool. real practical and, and traditional science can be a little stuffy, sometimes, but most people are pretty cool. They'll tell you that. So

 Michael Nelson 05:22
yeah, that's the difference between the ISSN meeting and I think I saw you get an experimental biology a couple times. So yeah, a little different meetings there.



05:32

20,000 people,



Michael Nelson 05:33

but yeah, most people probably know what essential fatty acids are and EPA and DHA. But if you were to give us just a short, like two to five minute primer on that, just to get maybe some new listeners up to speed on that.



05:49

Yeah, sure. Um, so we have fat in our diet is essential. Scientists at the University of Minnesota in the 20s. stop feeding fat animals, and they didn't grow very well. And they had a lot of skin problems. And they said, oh, there's something in fact, that's important. And they figured out, they deduced that it was omega six and omega three fats. My boss, actually at the time, Ralph Holman was the guy that, that figured out what the omega threes and omega sixes were at that time, so and, but so that the 18 carbon ones, and we find those in nature, those are soybean oil and seed oils. And actually, those are concentrated sources. But there's plant based sources as well. vegetables have leafy greens have a little bit of fat, and they have quite a bit of poly and saturation is omega six and omega three, and then we derive long chain fatty acids, like EPA and DHA, those are two types of omega threes, largely from Marine sources, there's bits and poultry and chicken and a little bit of beef. But those are the long chain ones. When we say omega three fatty, we're really there's like five or six different omega three isomers. So the main ones are that plant based one, a la, flax, walnut, discernible sources of that, and then EPA and DHA are the two long chain ones. There's one called DPA two, that's pretty cool. That's always in fish oil. And, but our bodies use long chain omega threes and omega sixes to create membranes. And then we also generate our immune system from essential fats. arachidonic acid is the big omega six one. I always thought that'd be a good name for a band. And



07:35

yeah, there you go. I think that's really good. Yeah.



07:39

But it's converted with Cox two enzymes and lipoxygenase enzymes into the hormone like compounds that regulate our immune function. And that's the one that's considered to be inflammatory, if you will, really important, we need it definitely. But a lot of omega six in the absence of omega three, tends to promote it immune response, it is maybe too much of inflammatory nature, so So adding omega threes to the diet helps balance that. And lots of studies that we've done, and others have demonstrated that, you know, Americans, people in North America really don't eat a whole lot of omega three compared to other populations around the world. And there's, there's health detractions based on that. So in particular, just eating a fatty serving a fish couple times a week, gives you a whole lot of protection for a healthy heart and reduce risks of atherosclerosis. So it doesn't take a ton, but, you know, but not eating those omega threes has as important implications in human health. So inflammation is one of them. You know, right now, we've learned about the media. We've talked a lot about COVID, obviously, the cytokine storm, yeah. And so inflammation is what I actually did my PhD on looking at sepsis. And we also looked at adult respiratory distress syndrome in patients. Oh, interesting, but study that hyper inflammatory state in humans, and also animals and then looked at nutritional interventions to try to change outcomes in those populations.

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Michael Nelson 09:11

And what did you find with that? Obviously, we're just Well, sort of speculating. But yeah, right. Interesting.



09:16

We had a we had a animal model that had about a 30% mortality rate, we infect them with a bacteria and two types of bacteria that were similar in the septic shock seen in humans, but but animals getting fish oil didn't die. They just did not die, but the animals getting control died, died about 30 to 40%. And then animals getting Cornell, which is a rich source of omega six fats. They were like 60 to 80% mortality in their car. So yeah, so this was an animal model, but you in animal models, obviously you have an opportunity to pre treat animals. So the clinical trials in humans didn't have much of an effect on mortality. It's because you were trying to intervene after the fact really. And okay, so So once this storm and this fire starts, it's it's difficult if there's a lot of dry firewood there to to abrogate that response so but the clinical trial that we did was impact was called impact it was an enter a formula that had fish oil, glutamine and a couple other components, but they did see no differences in mortality, but they did see significant reductions in infectious complications and meaning hospital staylinked was about 25 to 30% shorter, so

people got you, right. So that's, uh, ICU capacity is another topic in vogue these days with the demands phase hospitals wanting to, right, exactly, so, so people that got these added nutrients got better. And that was really, you know, the animals filled me that man die, it's really important to, to weather the storm of being ill or prevent illness. And in the in one, that diet was really important. So, and we're kind of seeing that today. With COVID, there's been a lot of people talking about the potential for various nutrients in COVID. And in having a strong immune system, vitamin D, and zinc and in omega three fats. And then there was a paper we talked about a little bit, yes, published, I think was out of UCLA maybe a month ago. But they measured actual blood levels of omega three in patients in the Los Angeles area. And it was a smaller study, it was like 100 100, folks, but they saw a 75% reduction in risk for people with the highest blood levels of omega three versus the lowest three core tiles. So it's a big difference. Yeah. And, and that that higher group was older, their mean age was 76 or 77 years old, and the previous, the lower court aisles in terms of their omega three status were around 70 years old. So. So older people did well, potentially, because they had more omega three in their blood.

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Michael Nelson 12:05

Do you know what the omega three levels? Were? I mean, were they sky high? Are they not higher than the normal population?

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12:10

They weren't it was omega three index. So it's, that's the DA che in red cells? They were? I think the fourth quarter was higher than 5.7%. So round 6% and higher,

M

Michael Nelson 12:23

is high, but not like, Yeah, but that's a crazy high.

o

12:27

Your eye? Yeah. For some of our friends. Yeah, no, that's, that's the thing. You know, just just having some fish in your diet or a dietary fish oil is just so potentially so powerful, you know, and, and that can be as simple it can be a nice salmon meal, or trout, something like that. But it can also be a can of sardines, that have about a gram and a quarter of epmd H a couple times a week that will put you into that, that protection zone. So people we work with tend to like to see them higher, we measure blood levels of EPA and d h a, and we do this hufa test that is the precursors for all this inflammatory stuff. And we want

to see that quite a bit higher. So we we recommend about 2000 milligrams a day of EPA d h A to hit those numbers for for people living in North America. So yeah,

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Michael Nelson 13:22

and that's not that high. I mean, I've know that like two to three grams a day, if you were on the lower end of the spectrum, you're probably going to be okay. And again, obviously, if you can get testing and work with your physician and have more info, that's going to be better. But, you know, I'm also trying to be realistic, because most people are like, whoo, like, Where should I be, you know?

o

13:43

Yeah, that's it's, and we see, we have a little questionnaire that goes to their blood spot test and just ask people, really, for them to reflect on it. But for us to have a YouTube, you know, how much fish to eat? How much fish oil? Are you taking any kind of omega three supplements, and a lot of people respond, I'm taking that supplement one or two times a week, you know, which means are probably taking it every other week?

o

14:06

Yeah.

o

14:08

It's fine to miss days. It's a fat soluble nutrient, but you just call up your dose to to give you what you need, you know, over that week period are average for each day. So but yeah, so I know. You know, triglyceride reduction works great three 4000 milligrams a day. And then there's been some omega three drug studies, where the purified EPA that are classified as drugs that are about four grams a day for those medications. They're derived from fish still, but they're purified EPA, they see big reductions in triglycerides. And then the big study by one of these companies demonstrated a very large reduction in risk after you've had a heart attack or medical complications related to heart health, so that's out in the marketplace. Today, but so yeah, it's real. And part of that that basis is looking at your membranes. That's where your means your your fat based immune response emanates from. And so you want to have in your phospholipids, you want to have to have equal representation of arachidonic acid and EPA d h, a. And that's sometimes referred to as a ratio. A lot of people are 10 to 15 to one that ratio in those membranes, and you want to bring it down less than five to one. So when, when a signal comes in, your immune

response signal comes in and says, Hey, we need some of this. PG two or throw boxing to fight this battle. Your your enzyme is seeing just as much omega three as it is arachidonic acid, omega six and omega three has a much lower emphasis on producing an inflammatory response and the racket onic acid. So

 Michael Nelson 15:56


are you looking at the ratio from your testing of the arachidonic acid in the blood compared to the RBC level? Are you comparing that to the blood level of EPA and DHA,

 16:06

we measure with the home collection kit, its whole blood, but all the things that multiple publications have mapped out equations for establishing equivalencies between whole blood and red cells and plasma in red cells. So that's kind of what the industry bases all that on.

 Michael Nelson 16:25

And you find a lot of what I've seen just looking at various amounts of your testing is that unless it's a really weird case, and again, I tend to see healthier people. I don't see sky high levels of arachidonic acid, but I do surprisingly, still see some people who are very low in omega three, especially EPA, and D. Ha, which to me is still kind of surprising.

 16:47

Yeah, it's, there's been enough information out there. And your audience is really attuned to performance and nutrition. You know, it's this is one of the easy ones, you know, to, to, to enrich your diet with. Yeah, we know arachidonic acid. You know, you feed humans about point 5% energy linoleic acid, and they max out their arachidonic acid. And that's that's our hint, that that in fatty acid is really important to human health and pathology. And without a we die, obviously, but but insane for omega threes. The increase rapidly to American diet has about 10% energy right now is little AIC acid. So we're eating, you know, quite a bit more than we potentially need for that, but that that's a highly debated topic. good arguments either way. So

 Michael Nelson 17:38

yeah. And in the I'm sure you're familiar with this word supplement realm, there's actually

a supplement that is pure arachidonic acid that has been used. And, you know, it has a couple of studies that are, I would say, interesting. I know a good friend of ours, he did some experimenting with it, and didn't see a huge difference again, and of one but yeah, any thoughts on that as a sports supplement? Or? They don't probably need to add it or?



18:09

Yeah, there was, um, well, it's all you know, it's all individualized, I guess. And I'm not obviously, Gary Nelson, did a study a long time ago, a metabolic ward in San Francisco feeding purified arachidonic acid and saw a lot of these inflammatory mediators skyrocket. So there was a little concern at that time, with small children giving them a lot of arachidonic acid as part of the normal nutritional regimen, but for for a lot of your folks, I think it has you know, arachidonic acid may have properties that help propagate or make muscle cells larger or make, you know, advances in strength and, and there could be because, you know, that physiology, you know, lifting and exercise has physiological signals that trigger the production of inflammatory response compounds and, and that may be beneficial or an adaptive mechanism. Some adaptive mechanism may be, you know, improving their physical performance based on that. You're the kind of guy that I would call it Yeah, there was a study today I get a feed from a guy every day on on omega threes in a study out of London, it was a small study, but they fed people for four weeks with the official dose and then looked at muscle soreness. Now poor some, some rigorous exercise and muscle soreness was down in people getting fish oil, versus placebo. And then it was a really small study though, but I'll fix was, I'll fix didn't increase in the fish oil folks. That's one of those cytokines interleukin six that that is one of the early telltale signs of your, your, your metabolic cascade to produce inflammation. So so that was pretty cool. But

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Michael Nelson 20:00

The 906 May I think have a biphasic response that if you're a healthy person and lifting you probably want it to bump up a little bit because of the inflammation of tearing muscle down and stuff. But then you don't want it to be like chronically elevated skyhigh either.



20:15

Yeah, yeah. Yeah. So it's, it's Yeah, muscle cells are rebuilding right after.



20:19

Yeah.



20:20

After that causes? greater mass. Yeah. Yeah, but, um, yeah, so inflammation, I think, can be our friend. But a lot of times, it's our enemy. And with these COVID patients and people are septic. I mean, their immune response is there, it's not meant to have from an evolutionary standpoint, it's not meant to, to necessarily have medical intervention, that sounds really weird, but our bodies evolved



20:47

with our own



20:49

physiology and separate from from medical care. So if you had a broken leg on a mountain and couldn't access anything, I guess that's your best shot, you know, yeah. But it's, uh, you know, this inflammatory response is just intense. And, and we see that when you injure your arm or your hand or gonna cut redness and pain and all that, when you do it on a grander scale. You know, hi, hind limb injury models were used extensively to study inflammatory responses that killed people. And that inflammatory signal that can be distal to organs like the lung can have a profound effect on lung tissue, because in the circulation, all these hormone like compounds, they roll around, and they stimulate epithelial cells, it's that good, wonky and, and start having their own immune response. And that's how it starts, you have multiple systems organ failure, and they call it systemic inflammatory response syndrome now, so it's too much inflammation that causes people to get really sick, and a lot of people to die. And that's what you're seeing with COVID. For some reason, with a lot of these COVID patients who get really sick, they respond much differently than other people. You know, I don't know if that's a function of how many COVID friendly receptors they have, or binding sites they have on their on their face to, you know, the tissues or not, but but so you've seen some of the therapies that have come out as old, old school steroids, it actually worked pretty Yeah, great people. So going back to basics, and but in, in medicine, today, there's soluble receptors for TNF and all kinds of anti cytokine based therapies to try to reduce inflammation. And one of the dietary strategies to reduce inflammation is just eating a whole bunch more omega three, or epmp ha, in your diet, and that, that will mitigate some of that type two, a coastside response. So you see your some of that information, you see. So



Michael Nelson 22:45

another reason for people to eat more fish or supplemental fish oil that they're trying to potentially reduce their their risk of developing, you know, COVID, like diseases or anything downstream from it. Yeah,



23:00

yeah. It's, uh, you know, it's, it's way too early to say for sure, but something Oh, sure. There's actually been, I think there's four different companies that have omega three interventions, the EPA interventions and COVID patients, and one was a multicenter trial between Europe and the US. And a friend of mine from a particular company was working on that. So. So there'll be some interesting data, you know, an acute model that will come out of this to hopefully give some more evidence on how effective nutrients are for for real, serious inflammatory conditions.



Michael Nelson 23:34

Yeah, I always think of what's the potential upside, which Yeah, at this point super early, probably don't. 100% No. And then like, what's the downside, right. And, yeah, fish oil, EPA, D ha, it's been in the food. It's been around for a very long time. So I think we've got a pretty good idea that there's probably not much of a downside to it from a risk reward type basis.



23:59

Yeah, it's, you know, our FDA, I think we're up to four or five grams a day are considered safe now. Yeah, was four or 5000 milligrams, and in the US 5000 milligrams, so we, most people are eating 80 to 100 grams a day. So we're talking, you know, just a few percent of your dietary intakes, or even Eskimos that were living on a marine based diet, diabetic and bang, the mean intake was about 16,000 milligrams of upnd a day and those popular they think 16 grams. Yeah, right. Well, they're eating their fish and whale blubber and, you know, extreme, you know, a lot of fat sources enriched in in those fatty acids, but we did some studies on polar bears a long time ago, too. And, and they had like, 30% of their, their phospholipids are up. Yeah, just crazy. Why is that? A seals Oh Galactus soybean oil in the Arctic. But



Michael Nelson 25:02

yeah, goes up their, their diet.



25:04

Yeah, their diet. But I was younger scientist at the time when I was really intrigued by that observation. But we had we had worked on some hibernating black bears at the time,



25:20

fascinated



25:21

in captivity. And so that was the other thing we were going to talk about a little bit was the Yeah, the so we'll put COVID arrest and if you've got aches and pains, try 30 days of two to 3000 milligrams a day of epmd ha and see what it does for you as a take home on that night. Um, but yeah, no animals. So we talked about melting points of membranes and things like this. So those epmd ha, are, are liquid at cold temperatures. So you can look at fish oil out of this minus 20, like we saw this past weekend. Yes. And it's still liquid, you know, looked at butter, it would be rock hard. So, so saturated fats obviously tend to be solid at room temperature and polyunsaturated fats tend to be liquid at room temperature. So, and epmd ha, are very liquid molecules because they have a whole bunch of surface area. They have a lot of double bonds that that don't make their fatty acid chain straight. It makes it very kinky and disorientated,



26:19

chunky fatty acid. Yeah, I know.



26:24

A really neat idea. It's a is it's just a, it has tons of different confirmations, which is from a biophysical standpoint, just really fascinating in and that's what your brain, you know, 30% of your fatty acids in your brain is d ha and then your retina, about 75% of the fatty acids



26:42

in your eyes. Is that high?



26:44

ha yeah. So highly functional membranes have a lot of dh a muscle tissue does as well. We've done a bunch of tissue biopsy work for for the military, and there's a whole bunch of dh a muscle as well. So a colleague of mine, Steve Finney, it always told me that arachidonic acid and da and membranes was responsible for glucose uptake. So glucose uptake and so, so in in some athletes, you know, we do see arachidonic acid real consistent among populations, but, but in athletes, we did some rugby players and most people are eight to 10%. For arachidonic acid these rugby guys were like 14 to 18%. Oh, my wife, so I, I don't think there was I don't think they were consuming arachidonic acid, but, but I think it said the functional aspects of, of muscle and glucose uptake in their muscles but



27:42

interesting.



27:43

Yeah, so that's one little tidbit. But

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Michael Nelson 27:45

yeah, that's one thing I look at an athlete's too is arachidonic and I every once in a blue moon I'll see someone that's like really low and arachidonic and again, it's just completely anecdotal, but they tend not to be like the best athlete and I don't know if that's just anecdotal or who knows, but it's something I've always just thought was interesting.



28:07

It could be it could be from oxidative stress. It could be from Drive. We looked at sled dogs hmm 1005 or seven, somewhere in there and wreck You know, a lot of sled dogs. So their sled dogs are cool. They're they're running 100 miles a day during races. And 20 kilogram animal has about a 10 or 12,000 calories a day burn rate, which was fascinating to me. But the dogs that do pass away very few do lots of good care now but dogs that have passed away typically die from gastric bleeds. So we looked at that model is a way to look at the importance of arachidonic acid in these animals. arachidonic acid is converted into co solenoid that protects gastric mucosa. So we we before and after races, and human cyclists. Steve Finney is related to Davis Spinney that was a famous bike racer, but they

saw reductions in arachidonic acid and those athletes, and then positive fecal occult blood tests after long races, suggesting that there was some compromise, you know, pretty interesting. Right? So we looked at sled dogs and we saw big reductions in in blood levels of arachidonic acid and then we took biopsies and gastric mucosa and saw a drop in in arachidonic acid as well. So we, we called it exercise induced or burned membrane syndrome, I think was the was the, the term that Finney came up with for that. But so there's a lot of oxidative stress. You know, we burn about 3% of the oxygen we probably use to produce energy is converted into free radicals. When dogs are producing 10 to 12,000 calories. Yeah, it's a big number. So that's swamps. proxies and systems that are designed to take care of that. So that may be some of the observation with your some of your athletes So, so adding some kind of antioxidant regimen or certainly food based system. So if it's green or yellow or red and not artificial, it's probably going to Yeah, benefits the colors mixed tocopherols Yeah,



30:20

yeah. Huh.



30:22

Yeah. Anyways, a little. Yeah. There's lots of lessons in life. And in extreme examples of performance, and I think some of the work we did in sled dogs and some of the people that we met through that process was just incredibly interesting. So But



30:37

no, that's, that's fascinating.



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Yeah, the one yeah, the one we studied five or six years for one race and one of those mushers was First Nations guy in us and he fed his dogs predominately seal and those dogs had the lowest burn, if you will, or lowest reduction in arachidonic acid, Lewis Mills Tuesday, but was that because



Michael Nelson 30:59

of the super high EPA d? h A or a different component?



31:02

I think so. Yeah. Yeah. Oh, yeah. One of the one of the worst performers, great racer, but he fed kibble, you know, a specialized kibble for his dogs. So with all the bells and whistles that modern pet food can offer. Yeah. But he had a very extreme situation in terms of physiology and metabolic demand. So, but, but pretty neat. So, but

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Michael Nelson 31:27

I think you're saying cold weather or even cold exposure can preferentially convert to more d h a, is that right?



31:35

Yeah, exactly. You know, in, especially in for cold blooded animals. Snakes and fish, they remodel their their membranes with largely with omega threes with D ha, we use D Ha. And cholesterol. Cholesterol is a rigidify for membranes and an omega threes and polyunsaturates will actually make a membrane more flexible and more fluid because it's like an antifreeze but we did some studies in hibernating gophers. Minnesota, Duluth,



32:10


Minnesota gophers. Yeah, right. I couldn't resist.





32:16

Yeah, and they were they have a Department of Defense study to look at thermal adaptation in a So Greg Bellman, who's a trauma surgeon in Minnesota, great guy, retired from them. He was a military doctor also. But he and Dr. Andrews worked on looking at hibernation and gophers. And they sent me adipose samples from hybrid and gophers. And they were liquid. And I, oh, wow, when they're frozen. And I said, Oh, yeah, I said, You must have sent me like plasma. And they're like, Yeah, no, no, that's the adipose. So fat on our own bodies is solid or semi solid, obviously. But if you look at like a beef steak or something like that, or chicken, you'll see fat in its normal state is, is not liquid. But so that was the first aha moment with those guys. And they had, they had quite a bit of more omega threes, they had a whole lot of oleic acid, which is normally found in in adipose, but that's what animals use. These hydrators are examples. You know, hibernating squirrels that we looked at in Alaska, their body temperature gets subzero just a little bit. But just remarkable models of physiology and adaptation. They they heat up, we did studies with


folks at the University of Fairbanks, the Arctic research group there, we just published a couple papers of them, but but these animals will heat up every 20 or 30 days on a cycle to 238 degrees or body temperature, and I don't know must accomplish some kind of physiological aspect for for their existence, and then go back down, but they've had a temperature sensor in a female gopher up in the north bank. And for five years now, and her plots her plots over five years, line up perfectly with time in such a cruel environment. Oh,

 34:09
yeah,

 34:10
that's sunny and warm for eight or 10 weeks at the most and then just brutally cold and dark and the rest of the time. But, but so animals, humans included, need poly unsaturation. We need poly unsaturation for membranes to work correctly. Those long chain and mega threes they interact with, with integral proteins that span membranes to send signals back and across the membrane and then for for animals, hibernating animals. It's it's turning, turning out to be, excuse me to be an important part of hibernation. So Hmm,

 M Michael Nelson 34:45
interesting. Yeah, I have a freezer in my garage. I've converted to cold water immersion at 3738 degrees. So if I'm in there for a few minutes a day do you think that's doing anything to convert anything thing or I'm not a hibernating bear, so it doesn't matter.

 35:03
Well, yeah.

 35:06
It's probably good for your cardiovascular system. Yeah. reactivity? I don't know yet to be honest with you. But yeah. But yeah, we're warm blooded. So we have we have mechanisms to, to change those things. But

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Michael Nelson 35:21

yeah, I've always thought like the hibernating bears are fascinating. It's one of those areas I've never formally studied at all. But I've just been interested in reading the research and partially because it's like living in Minnesota. That's not bad. Like you're a bear. You just get real fat and fall. Yeah. And then you eat everything in sight. You've got really interesting insulin, glucose mechanics, you store a lot of fat you crawl in your den. You don't exercise the bear is not in there doing like benchpress in the middle of winter or anything. And you wake up in spring, significantly leaner with very little muscle loss. Yeah, yeah. It's like, fascinating. It's like, does that happen?

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36:02

willy nilly? Yeah. Yeah, if you're, your listeners, this Arctic biology group at Fairbanks, and you can click on that link and see the people involved in all that research. I'm just a really ancillary part of that with my idea, fatty acid stuff, but it's, it's fascinating. And, and that's why, you know, that's my salmon and trout and certain fish that we consume, have a lot of da chain and EPA, it's because they're living in cold environments. And they're designed to using those fatty acids to keep fluid keep moving. So yeah,

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Michael Nelson 36:33

yeah. Did you know Dr. Paul azio, at the University of Minnesota?

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36:37

I don't think so.

M

Michael Nelson 36:38

Yeah. And he was in the anesthesia department, actually. But he spent some time studying black bears for more cardiac research. He worked for tronic and did some research for them, too, because it's, yeah, it's fascinating. I'm just like, how low like all the systems just just get super low. And yeah, they're fine. Like, there doesn't seem to be any ill effects, which is crazy. Heart rate is

o

37:01

20 beats or something?



37:03

Yeah. Yeah.



37:05

Yeah. dieleman and Andrew stay. They produced a drug out of it with beta hydroxy butyrate. And one other compound for treating people with shock related to bleeding. So Oh, interest was something really positive came out of that. Yeah, it's in use. I think it's in use now. So Hmm. So the government got there. Got a good investment out of?



37:31

Yeah, that research?



37:33

Yeah. So. But, yeah, yeah. Fascinating. So physiology has a lot of adaptive member measures. And the black bears we saw almost, you know, barely low levels of da che, and it just spiked three, four weeks into hibernation. These are in captive animals as well. So just internal mechanisms produced tha really kicked in. So



Michael Nelson 37:57

quite cool. Interesting. Yeah. My, my uncle lives in Alaska. And so we got to go up there, maybe seven years ago now. And he's outside of just outside of Homer. And he's to spend many years working up in northern Alaska, a lot of the indigenous populations putting in running water to a lot of small villages that were there. Yeah. And it was interesting, just talking to him about stuff. And he said, Yeah, when, when whaling happens, like everything just shuts down, right? Because that's like the thing. That's their whole, you know, subsistence, which makes sense. And so I was asked him, Well, what else do they eat up there? And he's like, well, they put seal oil on everything. Yeah, I don't like seal oil. And like, How does it taste? She's like, I they loved it. He's like, I thought it was horrible. And I'm like, thinking I'm like, seal oil, oil. And then I looked and what do you mentioned was, seal oil is like, ridiculously high and EPA. D ha, yeah. Right. So like, their diet. They're just getting skyrocketing levels of epmd. Ha,



38:58

yeah, yeah, we I've been in Alaska a few times. And I was on a little island in the middle of nowhere. I can't think of anyone was a cooker. But they had a farmers market, if you will, and several people had had soil out. Oh, interesting. You could buy and some was clear and look good. But some was really Brown. Really oxidized and looked like something I would make but but I found a cookbook there too. And it was from 58 years ago, but but almost every recipe had seen oil as part of it there. So So I mean, we live in the Midwest, where soybean and corn are our main food source, if you will, from the plant standpoint that we use the oils from those and the environment these people live in. It's you know, CO is the most abundant supplier of oil and fat. They have lamps. Colm Yeah, so yeah, so it was their calories are important when it's minus 30 Working on surprisingly



Michael Nelson 40:00

like one of the earliest studies you talked about too was that their cardiovascular risk was super low. This is like back for context for people listening. This is like back when we thought fat was horrible. Yeah. I thought oh my gosh, these people their cardiovascular risk gonna be astronomical and it was like the inverse, I think of what we expected.



40:19

Yeah. Greenland Eskimo react. Yeah. ancel keys at Minnesota was. Yep. Thanks. That's gonna kill you raise your cholesterol.



Michael Nelson 40:28

seven countries study.



40:29

Yeah, yeah. And so the folks in Greenland were eating 60 80% of their calories as fat and had relatively low incidence of cardiovascular disease. So that was one of the big aha moments. And they actually came to my predecessors lab, and they didn't know what these two huge peaks were in the chromatogram. Up. So we had a Ralph home and had a guy named Bill Christie, who was a really smart analyst. And then he said, Oh, yeah, that's epmd ha, so



40:59

Oh, wow.



41:00

Those were those weren't known at the time. But that's, you know, that's quite some time ago, but Oh, interesting. Yeah, yeah. So fun tidbits. But yeah, they were, you know, one of the extreme examples, extreme examples in in life give us a lot of big clues, because they really push hypotheses, like the sled dogs, or green and Eskimos, and we learn from that. So in COVID, maybe COVID may be one of those things that teaches us a lot. You know, it's a horrible thing. But yeah, it could be a silver lining that, that we learn a lot from it. So,



Michael Nelson 41:30

yeah. Do you think that like even people in that area, because they are so almost hyper adapted to an environment that's cold and has super high amounts of fat that once they get exposed to more Western diet, which has a lot of deleterious effects? They, unfortunately seem to do worse? It seems, is that correct? Or what are your thoughts on that? Yeah, no, it's



41:55

very much true. I mean, your your genetics are what you're, what you're exposed to. and nutrition has that as well. Yeah. lots of examples of the Western nations of First Nations people in Canada, that resulted in incredible amounts of obesity.



Michael Nelson 42:11

Yeah. A lot of diabetic diabetes. Yeah,



42:14

folks that just didn't see a whole lot of carbohydrate in their life. And then when you when you amplified refined sugars and things that were metabolized, you store, and so yep, there's a lot of sad lessons from that. But there's a CB s, or CBC documentary, Canadian Broadcasting Service that talks about some of that. And I think it was a guy named friend, Jay wortman was one of the one of the authors that good show.

 M

Michael Nelson 42:47

Yeah, and for research, people can look up the P man DNS, also they've been, you know, fairly well documented and studied in terms of the effects of, you know, high processed diets and glucose and insulin resistance and that kind of stuff, too.



43:00

Yeah, I learned a few weeks ago, I had a call from a guy in the East Coast. And I learned about Native agricultural practices that are having a comeback in terms of producing food and health benefits of native based farming. So there's a renewed interest in in practices that that help cultures span, you know, hundreds or 1000s of years in development. So

 M

Michael Nelson 43:22

yeah, there's a guy, Sean Sherman here in Minnesota, who's gone back and looked at, you know, for just cooking, just a phenomenal chef, like we had some food he prepared up north. And it was like, amazing. Yeah, he's gone back and look to see, well, what were the practices like, and it was very hard, he spent a lot of time trying to document it. And so he's working. I think he's opening a restaurant, hopefully this summer that will feature a lot of that type of cuisine, which I think would be super interesting.



43:50

Yeah, yeah, we try to we worked a little bit with some, some groups in Minnesota or native groups. And we tried to, you know, compliment them really that the practice they had were actually very healthy and sustainable. So it'd be neat to see that come around more. And the paradigm is always changing. Right? Yeah. I do like the fattier cuts of beef that you can earn at pork that you can find in restaurants. Yes. So some of those traditional darracq and things like that are fantastic. So

 M

Michael Nelson 44:21

yeah. Cool. As we wrap up just a couple more questions here for you. So I want to be respectful of your time. Is it possible to get too much EPA ndhca. I mean, especially now with, you know, supplementation becoming, you know, more and more concentrated. There's, let's say, older people in this strength coaching realm, one coach in particular was popular for just massive amounts of fish oil seem to solve everything. But I would imagine at some point that you're going to start to see detrimental effects or would you just have

to be so bonkers you're probably not really going to run into that.



44:57

Yeah. I mean, there's okay. constraints and membranes. phospholipids have two fatty acids that hang down and only one of those will be polyunsaturated. Hmm, generally, except for extreme cases, but so you can only get up to about 50%. So there's saturation, that's going to happen. And I imagine you just oxidize the other fatty acids and burn it off, so to speak. Yeah, right. Right. So there's, there was one clients of ours that did 40 grams a day. I think, you know, yeah, yes, I



45:27

know him.



45:30

He was disappointed his results weren't these results were super high. Yeah. They weren't like, way off the charts, you know? Yeah. Because, you know, because of how membranes work. And that's just the max that goes in there by design. So, but I never thought anybody would do that. This individual, again, another, another teaching moment. So, but, yeah, you know, there's, so Greenlanders did have a tendency to bleed



46:02

longer. That was my next question. Yeah. And clinically.



46:06

That's what, you know, 16 grams a day, even half a bottle of fish oil a day. We have a tendency to clot too much in our culture in North American diets today, so so dialing that back a little bit, I think is beneficial. You know, excessive consumption may abrogate some bleeding, but it's not. You know, it's the papers we've talked about. There's never been a documented case of surgical bleeding related to fish oil. Some of its overblown in terms of bleeding risk. But

M

Michael Nelson 46:36

yeah, that's what I was gonna ask you, because I keep looking for case reports, because it's like, okay, so your INR may be changed. Okay. So is it one of those things where statistically it can happen. So you do see a change, you do see a longer clotting time? Yeah, but at the same point, like if there were, with how ubiquitous fish oil is, and people consuming fish, and there was a massive bleeding risk, we would find just tons of case reports. And

o

47:02

now, Japan would be in trouble.

M

Michael Nelson 47:04

Right? Yeah. countries, especially Greenland, Japan. Yeah, it would be all reporting massive issues.

o

47:10

So so and that's, that's the rig in the clotting is regulated by the coast. noids and leukotrienes. These hormone count by largely these hormone compounds from fat. So, ya know, it's, it's safe. And you know, if you're concerned, you can talk to your physician. I doubt they'll know much more than Yeah, find out yourself. But yeah, so

M

Michael Nelson 47:33

yeah. And you had mentioned with the thing several years ago that farm raised salmon and some farm raised fish, especially salmon, I think you had mentioned, there was a published study I found too, that you had pointed me towards Yeah, EPA and DHT levels were unfortunately quite low in them. Is that correct?

o

47:53

Yeah, they weren't, they were down quite a bit. So they're in farm salmon. They used to use fish meal and fish oil to produce produce those animals are those fish that animals but in and they switch to canola oil. And so 18 are plant based with a lot of omega six in the net of that the net net was a reduction in the percentage of EPA and D ha, but they have a ton more fat they have they have a lot of fat in those fish now. Funny fish raise on

vegetable sources tend to produce more more fat, if you will, or fattier. And so the, you know, they're very different from wild type. So they have much more omega six, in their omega three is about the same because they have three times more fat than a wild.

M

Michael Nelson 48:40

Oh, interesting. So yeah, the EPA DJ went down, but because they have so much more fat, the shirt number is actually more equivalent, right?



48:50

And colleague of mine described it as, you know, the equivalent of hamburger. So I, you know, there's an example of fish. Fish didn't evolve, you know, consuming plant based here, right? That's a wrong statement. But you know, canola oil shares are in their regimens. So. So there's a big difference. But you know, that said, wild, wild fish is the best if you can eat it and afford it. It's incredibly expensive for a lot of people. So there's, you know, there's there's agricultural sources as well. And you'll just see, aquaculture is just growing and expanding as a way to offer protein to a growing world. So we add about a billion people to our world, every 10 to 12 years, and that billion people consumes the same amount of protein that's found in the US soybean crop produced annually so so you know, it's not as apparent right now food and security but as our world grows, it's going to become more apparent so but, you know, in farm, farmers markets are great places to buy farm raised meats and wheat. pasture raised chickens. I grew chickens on my own for fatty acid experiments and the taste is amazing and it costs a lot more but it cost me about eight bucks a chicken to produce some without labor costs factored in. But so that's that's the, you know, they're more expensive, but I think you're getting a much more fulfilling and healthier bird, if you can afford it. And we buy all our pork from from farmers markets and private producers and try to buy beef from those folks as well. So grass fed animals tend to have these more, more omega threes. There's not a ton of beef to begin with, but they tend to be, I think, a healthier choice if you have the option. So but to support those little farmers and local farmers.

M

Michael Nelson 50:36

Yeah, we're trying to do that as much as we can to we actually just got from another farmer in Wisconsin, he had someone who canceled their order. So we're like, Yes, we'll take it. And he showed up at our door yesterday, which was awesome. And he dropped it off. And I'm like, thinking, Man, are we gonna fit this on our two freezers, and we had to take everything out of restack. And we got everything to fit just just barely, so it's nice to

be stocked up.



51:01

Yeah, and that farmer, I'm sure really appreciated it too. So it's,



Michael Nelson 51:05

well yeah. And plus, I mean, it it's gotta be a hard go doing that. And I talked to him about it. And even just the margins are not really super high. And most people I know doing it, just do it because they love it. And they think it's a better way. And yeah, you know, if I'm in a position where I can support them and get, you know, high quality meat out of it at the same time, it's a win win.



51:25

Yeah. There's a definite taste difference. Yes. So especially in chickens. Yeah, I get to Mexico Simon. I get we buy chicken down there. And it's Yeah, the adipose is super yellow that has lots of carotenoids. You know, they've been rattling around in the countryside eating bugs, and they the chicken just tastes amazing, you know, and it's because it's fed a diet that's probably more wild than anything.



Michael Nelson 51:49

Yeah, the eggs are like that the first time ever went to bought I went down there kiteboarding years ago. And we're in la ventana and just small place and you just it's all markets that people you know, sell their eggs and stuff. And so we got up in the morning made a an omelet, and I cracked this egg in there and like the yolk is like glowing orange. I was like, holy crap. Look at this.



52:10

Yeah, they taste wonderful.



Michael Nelson 52:12

Yeah. Oh is amazing. Yeah. Eggs.



52:13

Eggs are good food. So that's there was a recent study that showed reduced cardiovascular with with increased egg consumptions.



52:21

Oh, nice.



52:21

I hope I'm sure you do. The old dietary cholesterol was such a horrible thing.



52:27

Oh, yeah.



52:28

Finally being exhausted. So.



M

Michael Nelson 52:31

Cool. Last question. So I think you if you were to make just a broad speculation based on the research, two to three grams of EPA, D ha, do you think that's a reasonable amount without knowing too much about diet intake? Or maybe consumption of the higher fish meal two, three times a week?



52:51

Yep. Yes. And that's based, that's based off of hard science. Bill, Lance had a giant arfield at a study and BBA in 1989. Okay, that actually looked at intake and output and blood lipids, and he has a calculator, you can go to e fa education.org. There's a calculator there that you can use to calculate how much you need to get to a blood level.



53:18

Oh, very cool.



53:19

So but yeah, you can take a blood test with us, obviously, you like to get to that balance that 5050 balance that that bill and talks about, it's about 2000 milligrams a day for most people in the US. So if you're a bigger human, or you're really active, I would, I would push more towards 3000. So you can certainly get on the mega three blood test for a variety of people's it'll, it'll it'll give you that. That number as well. So

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Michael Nelson 53:45

yeah, we'll have all the info in the outro for your your blood. Yeah, yeah, people can get more info on that, which is great. Yeah. And do they have to take spread out over the day? So if I'm taking, like, supplement, and I'm taking a gram per dose, I take it with three meals? Or could I take it all at one meal, or doesn't matter?



54:05

You can take with one meal. But there is some data that suggests that, that splitting it up three times is good for production of protectants and resolvins. So so if you're disciplined enough, the most important thing is to make sure you get that dose in every day. But if you're disciplined enough, take it throughout the day with your meals to sell and, and you know you've taken fat with a meal helps digestion and absorb most of it as well. So, yep, but it's just really important to try to get into that daily routine because you can slip a lot of times and then it just goes away for some folks. So yeah, but there's a lot of concentrates on the market now too. You can buy that'll have, you know, 500 to 900 milligrams per capsule. So, three, four capsules, and you're good to go. So,

M

Michael Nelson 54:52

yeah, they've come a long way with it being a lot more concentrated than 15 years ago where it was like a whole bottle to get a couple of grams. Sometimes depending upon what You bought



55:01

a dozen capsules, a regular official? Yeah. You know, now I take, I think I take six and they're 700 milligrams each. So I get 4.2 grams about that. So, but that's my strategy. So



Michael Nelson 55:14

yeah, awesome. And where can people find more information about you if they're looking for just information or possibly consulting or other things that you do?



55:23

Yeah, our website is liquid lab.com. And then our blood test is omega three test.com. So our new website for that should be up in about four weeks. So we're working on that right now. But there's a splash page. So



Michael Nelson 55:38

cool. Awesome. Well, thank you so much. I mean, I've been using your tests now for almost over a decade. And yeah, I use it with all my clients and stuff. And it's, it's been super useful, I think, because it's one thing to say, yeah, you probably need more omega three, and I can look at your diet and get a rough idea of where you're at. But it's a totally never thing for them to look and see where the levels are to look at their mega six some of the other values. And I think there's something about having the actual number, and then telling them that, hey, if they're really bad, often, I'm not so sure they're kind of down with the fish oil. I'm like, I'll I'll pay for your test. And I'll do it again in like three months. Right. So something to think about them knowing they're going to be tested again. They kind of drive compliance, too.



56:25

Yeah, that's,



56:27

yeah, that's a cool part, you know, 30 to 6090 days, you can retest and see if what you're doing is, is working for you. We've done that with a lot of athletes, a lot of Olympic athletes we're doing with some special forces people right now as well. So that test really allows you to dial in, if you're if you're darn serious about what you do. But yeah,



Michael Nelson 56:46

that home test, too. So yeah, mail it out. People can do it at home, they don't have to go in they don't have to donate blood or use an IV or anything like that, or get a

phlebotomist. That's kind of nice. You can do it at home and mail it in, and they'll get you the results, which is great.



57:01

Yeah, yeah, it's been a useful tool. So but but thank you appreciate talking to you. Yeah. Thank you so



Michael Nelson 57:06

much for all the great info. I really appreciate it. And I always appreciate all the help throughout the years. Whenever I get stuck on omega threes. I'm like, I gotta ask Dr. Doug Hill.



57:19

Likewise, for physical performance, and yeah, yeah. All right. Well, thank



Michael Nelson 57:25

you so much. I appreciate it.



57:27

Thank you. Take care. Have a great weekend. Yeah.



Michael Nelson 57:31

Thank you so much for listening to the podcast today. We really appreciate it. Big thanks to Dr. Doug for taking time out to do the podcast. As always, I mentioned at the intro that I've got a crazy offer for you. So I talked to Dr. Dog. And I wanted to promote some of the testing that he has, that I've used for quite a while and really like, I don't get any commission off of this test other than the disclosure I have is that I do use it with my clients. So if you go to omega three tests.com, that's with the number three o m e g a three, t s t . c o m . So omega three test.com, the regular price is around \$165. And he said for a limited time, anyone who listens to this podcast, will be able to get it for just \$30. So that's not \$30 off, that's a total cost of 30 bucks. The key is you have to type in the code there, flex diet, all one word, FL xdt.com type that in on the page at omega three

test.com. And for a limited time, you'll be able to get the entire test for 30 bucks. It's normally like \$165 it is limited. We don't know how long this will go for. But go there today. type it in. I don't have any disclosures. I don't make any money off of that particular test there. But I wanted to do it to help promote his testing which has been super helpful to me. So make sure you check that out. Big thanks to Dr. Doug. And as always, it's also brought to you by the flex diet, go to flex diet.com fxdt.com and your ability to get on the waitlist for the next time that it is offered. Also puts you on to the free daily newsletter. Thanks again for listening. I really appreciate it. Any reviews, comments, anything else? Subscribe, all that stuff always appreciated. Thank you so much. Talk to you all soon.