

Dr. Mike T Nelson

Hey there, what's going on? It's Dr. Mike Nelson. And welcome back to the Flex Diet Podcast where we talk about all things to increase lean body mass performance, and do it all without destroying your health in the process.

And today is just a solo cast with me. And I'm going to go over some of my notes and all the great things I learned at the International Society of Sports Nutrition conference happened two weeks ago, in June down in sunny and very hot and humid to Florida.

So the podcast today is brought to you by the Flex Diet Certification. So if you want more information on the flex diet, which is eight different interventions that are designed to increase your ability to recover via primary nutrition, like covers everything from protein, fats, carbohydrates, NEAT, which is non exercise Activity Thermogenesis walking around moving, exercise, sleep, micro nutrition, fasting and more.

To learn all about it, go to flexdiet.com. You'll be able to get on the waitlist for the next time that it opens up. And I'm not sure exactly when that will be probably not for a couple of months yet. But when you get on the waitlist, you will also be entered into the daily newsletter has lots of great free information, send out some information about the conference.

So as I mentioned, this was the 19th annual ISSN conference, Fort Lauderdale Beach, Florida. It was June 16 through the 18th 2022. So you want to make sure to head down there for the 20th annual ISSN conference next year. I think the first ISSN conference I went to was I want to say 2009 2008 I think then honored to speak there a few times. First time I did there was 2011 talking about metabolic flexibility. So it's been great to go to the conference most years. awesome to see tons of wonderful people again, just real great information. awesome group of people too. First up on the talk was Dr. Guillermo Escalante with the science and application of fasted versus fed cardio for fat loss.

If you're following me on the old Instagram, they're just Dr. Mike T. Nelson. I put up a post about this with some of the slides from his talk. And I thought he did a really good job. Because anytime you mentioned the words fasted cardio, who still brings up a lot of debate. So the real preface is for people who are new, that if you're doing cardiovascular training, and this is in the context for body composition or fat loss, it is true that fasted cardio at a low to moderate state.

And most people, again, there's a huge amount of variability here. But in most people, it will use more fat as a fuel source. So that part is 100% true in terms of the kind of fat burning zone. Now the caveat and where it gets very confusing is does that necessarily lead to more fat loss and better body composition? Again, my bias is, I think that it can, but it's definitely not at the top thing to do.

Obviously, calories are still going to matter here. sleep, exercise, recovery, all those things are going to come into the picture. I think doing your cardio training, fasted is probably farther down on the list. However, my biased opinion is if you've got everything else in check, I do have clients do fasted cardio. Now another caveat there is that this is also normally much easier to do.

You get up, put your shoes on, maybe go for an easy walk, run, get on the bike, do some rowing, whatever it is you want to do. You don't really need to do anything beforehand, right? Because usually you get a lot of questions of, you know, what do I eat beforehand? on what supplement do I consume? What type of warm up? Do I need to do? How slow do I need to start out?

Pretty much don't have to worry about any of those things with fasted cardio if you just get up and go do it. So I also think that it does make it easier. In terms of is it more advantageous? Dr. Guillermo did a really great talk. And the data is pretty split, there's some data showing that might be beneficial. Some data showing that it probably doesn't matter all that much and didn't show a huge benefit. In this takeaway, which I would agree with, is if you're a general population, and just getting into doing cardio, just go do it don't really worry about if it's fasted or not.

If you're a physique competitor, and you've got everything else dialed in, and you're really trying to get at those last few percentage, his opinion was, it might matter. And again, we don't have any data in physique, competitors, or even higher level athletes at this point. But I would agree with them that at that point, it probably does matter. And my last bias in this area, is I do think it might be beneficial for increasing health. If you can upregulate, your body's use of fat as a fuel, which will help the one end of metabolic flexibility.

There's a fair amount of data now showing that from a health perspective, that is going to be a great thing. So how do we think about it in my head is, I think most of the time for exercise in general, we just think about burning calories. And I like to think of it as what is the performance and the adaptation that we primarily want from exercise. So if you're lifting weights, do you want to get stronger? Do you want to add hypertrophy Do you want to a combination of both.

And then for cardiovascular training, I think of it from what type of aerobic adaptations do we want, because remember, aerobic base, your aerobic metabolism is going to determine your overall energy, your ability to recover from one session to the next and even intra session. So from one set to the next set. And that I like thinking of adaptation again, and performance. In terms of calories. I like the lower intensity stuff. So if your goal is primarily body composition, that I think fasted low intensity cardio would fit in here. So would walking and just general neat.

So those are things that you can do a fair amount of, they're not extremely energy intensive. And the key part is that they don't seem to up regulate appetite, some very interesting data on high intensity intervals. And it's a little bit split, but most of it, I would say is pushing towards that. If you do more higher intensity work, it does tend to up regulate appetite.

Now again, that's not necessarily a bad thing. But if you're really trying to control calories, what I've noticed in clients is that sometimes it can make it quite difficult. So I like to think about can we sneak more calories out of the system without triggering that appetite effect. So if we have our weight training in place for the adaptations, we want, maybe strength power hypertrophy, we've got some cardiovascular training in for the aerobic adaptations.

And then we may add in things to sneak more calories out of the system. This would primarily be walking your step count, and potentially fasted cardio in some clients. The analogy I was given to someone else on a call the other day was if you're an unethical say, operator of a cache a business or a cash till, how much can you sort of skim illegally off of the top without the owner really noticing, right? If you get too greedy?

Yes, you got more money out, but you probably got caught. If you're just sneaking a small amount out of Michigan do that day in and day out, you'll probably end up with a higher amount. Right? So we want to sneak as many calories out of the system as we can, they'll potentially outbreak and lead up regulating appetite. So again, those are all my biases there.

So the next talk we had was Moza Rosen, I believe it prompts that correct. NAD muscle and athletic performance, current research and future needs. So NAD is one of the molecules that is used in energy production pathways.

Right now the two main supplements that are promoted to increase it is a supplement called and R and also mn n. Those are acronyms but both of them Those are in the NAD pathway. And in theory, supplementing them may increase NAD which may increase energy. So her talk was sponsored by chromadex. They make an nr supplement. And it was it was interesting. It's something I've been kind of sort of watching Off and on now for several years.

And her conclusion was that it might be beneficial. But the current research in terms of performance just isn't a lot of performance studies on it. So my dissertation was, if this is increasing energy production and those pathways, at some point, we should expect that it would be what's called an ergogenic aid for exercise, it'd be something as a supplemental form, that would increase exercise performance.

Unfortunately, I haven't really seen a ton of data on that. And the data right now in exercising populations, just isn't a whole lot. So her main takeaway was, we should be looking at this as something that may be an ergogenic aid. And I would 100% agree with that.

As of this recording, I'm probably going to do my little and our experiment, I bought a bunch of it. The downside right now is that both of the compounds and RT m and n are quite expensive. Still, granted, the price has been coming down. But they are expensive. And to the credit of chromadex, who does have a patent on nr, they have done a lot of studies for many, many years on it.

And those studies are not cheap to run. So if you are one of the producers of it, it's costing you a lot of money in order to sponsor a lot of the research. So I understand why it currently is more expensive. Even supplements like creatine monohydrate. Back when they first came out, were also crazy expensive. But over time now, you know, creatine is very inexpensive compared to what it used to be.

So personally, again, this is not recommended for anybody else, I'm going to try taking 1500 to 2000 milligrams of nr per day. And I'll probably run that for I think about enough for six to eight weeks. And

see if I notice any difference. This would be self reported energy, heart rate variability, heart rate and any performance data that I can get.

And I'll keep you updated on what the results are. I'd be super curious if anyone has used either one and what you found. I know in some places, you can get an infusion of NAD directly via an IV, I have not done that. Downside there is I've heard that it can be quite painful. It takes a while. We have even less data on that. And it's also very expensive, but I know some people who have used it. And you know the anecdotal reports have generally been positive. So something that I think to keep an eye out on for in the future.

Next talk was Dr. Scott Forbes. Talking about creatine and the cognition that I'm working in, get Dr. Scott on the podcast was able to hang out with him again, which was awesome. So again, make sure to follow all of his stuff on Instagram, he's got great things. And creatine as we know for muscle has been shown to be effective to increase performance.

But it also may have cognition affects to does creatine is that the base of energy production. And on this podcast, you can listen to another one I did with Dr. Eric Ralston, we went really deep down in creatine and cognition. And a lot of what he said matched with Dr. Scott Forbes that also, creatine looks like it has very interesting potential for cognition and for brain health.

The downside is for human subjects studies, we don't have a ton of data, we don't really know exactly how much dosing, we would need to maximize creatine stores in the brain, it's probably going to be much higher than muscle.

I know just based off some of the work I've read from both those researchers, I speculated that it might be 10 to 20 grams per day, if you're using it for more of a neuroprotective effect or cognition. But we don't really know there's very, very limited data on that.

Part of this is there's no good way other than some invasive works, such as using technology like Mrs and other technologies to try to get out how much creatine is in the brain. With muscle we can go in and use the old Bergstrom needle and take out a chunk of muscle from tissue and we can analyze it and we can do chemical things to it with the brain, we can't really do that.

So we're left with some non invasive imaging which can give us hints. We're left with animal studies. The downside with animal studies is that it appears a little rodent friends that mice and rats, I can't remember which I apologize, I get it mixed up all the time. So I'm not a mice or rat researcher. So people sent me all sorts of hate mail for it, I'm sure.

But they appeared to store creatine in their brain at much higher rates than humans. So initially, I was all excited about some of the rodent data that looked at reduction in TB eyes in a group of little furry guys that had creatine and the group that did not. Unfortunately for the mice in the study, they both got whacked on the head with a set amount of force to induce a TBI.

The one group a little rodents got creatine, the other group did not the group that got creatine did much better. The downside with that, as you figured out, we won't be able to do a randomized control trial creating TBI, as in humans, no IRB is ever going to pass that and for good reason.

And we can't sacrifice the humans and look at their brain. So we're left with non invasive methods. And the creatine uptake in humans is also or appears to be quite different. But overall, I thought his talk was really good. I do think this is a very fascinating area of research. And hopefully, we will learn a lot more about it in the near future.

Next up was Wendy Irlbeck, practical applications for fueling today's young athletes. And it was a really good talk to have some nice practical advice. And my big takeaway from it was, and I'm guilty of this too, for general populations, and she works with a lot of younger athletes too, we have to keep in mind that just like with weight training, you want to start off with wherever they're at, and give them things that are effective, but also simple.

All right, so my little catchphrase is that physiology is complex. But your actions should be relatively simple. So as you know, coaches and trainers you're translating for clients, you're going to conferences like this, listening to fun podcasts like this, and taking that information and making it useful to your clients. But I thought she did a really good job of presenting things that were helpful, lots of case studies.

And the takeaway was that most of the information that these athletes were doing was, it was correct, but it was nothing earth shattering. And that's not a knock at all, that's what we actually need. Because the end goal is to make it practical so that people can actually do it, so that they can get the benefits from it. Once they've been doing that.

And you want to make things a little bit more complicated and add steps then by all means, but most people when they start don't need a checklist of 17 things to do by Monday, they need you to figure out what is the highest leverage the things that are going to get the most result with the least amount of effort, maximize those first and then move down from there.

And shameless self promotion. That's how I created the flex diet cert. So the interventions in there, the higher leverage items are near the front part of the course, that you would start on those to get clients moving in the right direction.

Next up was Citocoline, a potent brain health a nutrient and nootropic. This one was by Akito Mishimura. I hope I pronounced his name correct. And acetylcholine is something I've followed for quite a while, I've actually recommended it to be used for different formulations that I've done with companies in the past. It has a lot of really good data. It's been around for a while, it's like I said, there's very good human data in it.

The big takeaway here is as a nootropic, so something that may enhance cognition or sort of mental performance, as little as 250 milligrams can increase the tension. And they were also looking at studies in kids aged 13 to 18. Looking at 250 or a 500 milligrams per day, and on different metrics such as a

tap test, they did see an improvement, which I thought was pretty interesting because a lot of the data on acetylcholine or CDP choline is in older people. So one of the big questions was, Is it beneficial in a healthier population? is the data I've seen would say yes.

And then next question is, Is it beneficial in a younger population? And some of the data they presented? would say, yes. So. So the choline, one thing to look out for it is, if you are listening to this new new formulations, I got to see my buddy, Vince, again, who is awesome.

You can listen to the podcast here that we did from him. He used to be one of the main PhD formulator guys at on it back in the day, to get to see him and chat with all different things with him. But if you are using CDP choline, they do enforce the patent and for good reason they spent a lot of money on it. So the raw material is still a little bit more on the expensive side.

But in terms of things that are beneficial that you can put, sometimes in beverages, or especially in powders that are efficacious, that do have a lot of data. Also grasp status, so generally regarded as safe. CDP choline is one I would put near the top of the list.

Next up was Astaxanthin as a dietary tool for exercise training. This is by Dr. Karen Hecht. This was sponsored by Astra real. So again, as the Xanthine is one of those compounds I've been following for quite some time, oh, God, probably going on 13 years now. Actually, I first saw it for IFE muscle fatigue, at the ISSN conference, like many, many years ago, and the thought process there was as to Xanthine, is this red colored carotenoid they've ever seen, like crabs, and is the red coloring in them.

It's also used as a dye in salmon that are farm raised, salmon that are farm raised, aren't really Pinky colored at all, the flesh is actually this weird white looking color, and it looks weird. So as to astaxanthin, has been approved as a color additive for salmon. And that's because the salmon aren't eating the same food that they would before. So their flesh doesn't get colored that way. So as to astaxanthin, as I mentioned, is a very interesting antioxidant. It doesn't appear to kind of readily spin off a lot of pro oxidants, which is interesting.

It appears to have these weird kind of fat and potentially water soluble characteristics to it. That part's probably been a little bit debated. And as I said, initially, I started with eye fatigue. And the reason that it seemed to help with that is it the muscles around the eye, are highly oxidative. And they're working a lot because they have to do these very small movements all the time during the day. So they're kind of on all of the time.

And astaxanthin was theorized to reduce some of the sort of oxidants that these working eye muscles were producing, and they could help performance. There's some very interesting older data again, in our road and friends about some pretty massive increases in aerobic performance with astaxanthin. And the way that it worked, there was possible changes to something called CBT. One CBT one is carnitine palmitate transferase.

One, it doesn't want to the little guys, you need to get fat into the mitochondria to be used as a better fuel. So if you can get and run more fat through the mitochondria at a faster rate, you can increase sub

Max exercise performance. And in theory, this might be beneficial also for fat loss and body composition, potentially treating other diseases. In the study, they showed some pretty big changes in rodent endurance performance.

And I tried it at that time, and I've tried it with different athletes in the past. And unfortunately, a lot of the human data at least in terms of exercise performance, it's still pretty mixed. They presented some data showing performance increases in some studies, which was interesting. Some of the other studies are still kind of mixed, at least in terms of the effect size that we saw on our road and friends. That big of an effect size hasn't been shown in humans, but still very interesting.

That's one of those compounds that I keep trying to stay on top of the research as best that I can. They presented some new data there that over 70 plus studies have been conducted on it. Benefits of two to 12 milligrams per day, six milligram per day dose saw an increase glutathione by 7%.

They had another group where they had supplemented at For milligrams per day with training, and they saw that the squat in terms of number of reps that were completed was increased. And then they also looked at changes in CRP. CRP is C reactive protein.

It's a pretty decent and rough marker of inflammation in the body. It's probably a little bit of an oversimplification, but it's one of the markers you can get on a blood panel. And in that study, the one group taking us to Xanthine didn't really see much of any change in their CRP, the other group saw a 57% increase in CRP.

So it looks like you may be able to get a slight exercise performance benefit, that's probably still debatable, but maybe you can do it at a lower cost, then your body is producing less inflammation overall. Again, we do need some local inflammation for the responses that we want. And that is kind of a triggering effect of these signaling molecules.

We don't want inflammation to go absolutely rampant throughout the entire body either. The nice part is asked to Xanthine has come down in price quite a bit and it used to be quite expensive. Right now it's even gone down even more in price. And just in a private conversation I had with them. The brand I think it's doublewood on Amazon was selling Astra real, like ridiculously cheap.

So I stocked up on a couple of bottles. Again, I don't have any affiliation with any of the companies here at least that I know of. I don't have any affiliation with them. Maybe by the time you're listening to this, that won't be true. But yeah, so I thought if you're looking at it, that may be a good source and go from there.

Next up, we had the science of cannabidiol by Helena Yardley, she has a PhD. She works for the Canopy Growth company or corporation. And CBD again is one of those things I've been following probably for like the last five years or so maybe six years now. Right in as Department of Agriculture 2018 changed the egg bill and said that if you're using hemp, which they defined as you know basic cannabis or marijuana, that is under point zero 3% thc. It's a very, very little THC, that it is considered a

supplement, and not necessarily regulated as a scheduled one compound. Though cannabis and THC are currently As of recording, at least at a federal level in the United States.

They are considered a scheduled one drug. So they scheduled one drug means that there is no medical use for it. And there's an extremely high risk of potential addiction. So cannabis doesn't really belong in that category at all. There's been medical preparations of cannabis that have been approved for quite some time. Marinol is one of the earlier versions in the 90s which is literally just THC. So THC is technically Delta nine tetrahydrocannabinol.

That is the psychoactive component in cannabis or marijuana. We also have CBD approved as a drug under the name Epidiolex. There's also other preparations such as sativa x. So we have these different preparations that are approved as drugs, which by definition, you would think would violate the schedule one but they've got kind of an interesting legal work around there. So since 2018, you can buy CBD cannabidiol as a supplement. So the two main cannabinoids in cannabis are THC and CBD. So cannabidiol THC is really the only one that is psychoactive.

Some of the other ones and very high amounts. Maybe the THC is the main one. And then there's also a host of other compounds There's well over 100 different cannabinoids that have been identified so far, CBI CBN, or you'll see a lot more from CBG. So you mentioned that in her talk.

And the main reason for that is it's easiest to extract. So the main issue with a lot of these other cannabinoids is the expense it's going to take to extract them. So at the end of the day, right, the company has to make money. So the next cannabidiol I think, or I shouldn't say that but I should say the next big cannabinoid that you'll see is probably going to be CBG.

Now again, that may or may not necessarily be for the data behind it. But probably because it's going to be the easiest to extract CBN you're seeing some stuff with that now for sleep. I was asking her about that. And there's a little bit of data. Most of it's kind of anecdotal right now. I did some metal one and just some testing of it. I was thinking about producing a supplement that was primarily CBN. Again, just based on my preliminary testing and the fact that there isn't a lot of testing for sleep, I kind of decided against it, which is probably not doing my pocketbook any favors, because I'm sure it'll probably be super popular right now.

But yeah, whatever, that's life. And I'm okay with that. Again, it might be useful safety data on it looks to be pretty good. And is CBN is also starting to come down in price now. So it's at the point where you probably could do it as a supplement and still make money on it again, dependent on your sourcing of that. So we're talk was really good.

I talked about CBD and pain relief. And that CBD she said, is best described as kind of a normalizer. So if we back up and we think about the endocannabinoid system, this is a system that I mean, for all the freakin physiology that I've taken. I don't even think we mentioned it more than like in passing like, oh, yeah, it's a thing. Next topic. It turns out that see the CBN or CB, D THC. These are all cannabinoids that interact with the body's endocannabinoid system. So your body itself produces its own cannabinoids. So anandamide is one of the cannabinoids, your body is endogenously are producing

within itself. So the endocannabinoid system plays just all sorts of roles in physiology, you can kind of think of it as a little bit more of the fine tuning system to your body and to your nervous system. So she describes CBD as more of a quote normalizer. And other things that she said that looking here. Yeah, there's the data on it was pretty mixed.

And she did a really good job of giving the presentation of kind of the overview of just cannabis and CBD and cannabinoids and what's going on. The other part too, is that a lot of CBD products are way under dosed, right? So a couple of milligrams of CBD, probably really not going to do anything. I know there's some limited data showing that very small amounts might be beneficial. I would say maybe, typically, doses probably need to be in the hundreds of milligrams to be effective. And we haven't quite sorted out who these may be effective for.

So I've tried CBD and recommended it to different clients. I've used up to three to 400 mg's on myself just to see what would happen. And my conclusion is, I think it can be beneficial for some people. So for sleep, I've had a few people report that it made a huge difference for their sleep. And other people said, Yeah, didn't really do a whole lot. I've done some testing with omega wave looking at something called a DC potential to try to get at direct brain function. CBD appears to help DC potential but not every time, I could still brutalize myself.

And then Jim did a lot of speed and power stuff. And CBD wasn't going to completely normalize that. But as far as I could tell, it appeared to have a beneficial effect. So like all things, I think we need more research in that area, especially in terms of sports, nutrition, there isn't as much data there, there was probably need to be higher. And then I really don't trust the many CBD manufacturers at all. Because the expense in a lot of it is things that you don't necessarily see in the background. So the testing, where did you get it from? How do you extract it? Are you actually even putting the amount of CBD in the bottle that you say is on the label?

Are you making sure there's not high amounts of THC or over point zero 3% thc? You can look up there's several things now where they've done testing on CBD products and many of them do not meet label claim and many of them do have other components in there that are not supposed to be in there.

Again, right now as this recording, I do some affiliate work for Charlotte's Web through driven nutrition. And I'll put a link in the notes if people are interested in that. I've toured the facility over two days in the past awesome people like really top notch facility, and they have tracking on all of their products. So you can scan a little QR code, you can get the lot number, and you can see exactly the COA and all of the information that goes into it. Again, to do all of that is expensive.

And companies that are doing it the right way, in general, we'll be more than happy to explain what they're doing. Because it is a significant expense to them. And they're happy to show customers what they're doing. So if you have questions about your CBD product, I would recommend you contact them directly. And just ask them, you know, those basic questions and companies that are legit usually are, like I said, more than happy to help show you what they're doing in that area.

And next up, we had a great talk from Dr. Kirk Escobar, the evolutionary inertia of weight loss and a body re composition. And what I really liked about his talk was, it was very much based in science, but it was also very practical. And one of the some of the takeaways from his talk was that maybe physical activity might actually decrease resting metabolic rate, which I thought was interesting and something I need to probably go back and look up a lot more on that resting metabolic rate generally doesn't move around as much as what most people think.

And in terms of how humans are expending calories, he had a quote that is estimated that the more Stone Age human expended about, you know, 1200, I have here 1,290k Cal's per day, misses and movement in the modern humans are around 555k Cal's per day. Again, I would have to look up the exact references on that.

But that wouldn't make sense to me, if you look around, people just generally don't move as much as they used to, we can look at other supporting data on that from step counts, which have gone down. And we know that just at a lower flux of energy, your body just doesn't work nearly as well. So Hint, hint, I'll be, I've already been working on it for God, a year and a half now is a book. Hopefully, that'll be out maybe later this year, early next year. With more on that concept. In general, your body genetically does not want to add muscle and lose fat.

Which is true, because your body is set up for efficiency. And if we think back in more of the caveman days, it required a lot of work to go get food. And if you look at different places now that don't have a lot of technology and different tribes.

It's a fair amount of energy expended just to get food every day. We're now I can literally hit two buttons on this crazy piece of technology called the smartphone and Chipotle shows up at my door, which I do have to admit is pretty damn amazing. But we can now get food with very, very little movement. That was not always the case.

Right? So remember, your body wants to be as efficient as possible. And it is literally more efficient for you to go through the drive thru and get 1200 calories for \$3.19. Right? Do you even have to get out of your car didn't even cost you much money. Your body is literally wired to do that, because it's an efficiency thing. Right? So back in the day, starvation was a real thing. The the people who did better, or people who were more efficient, who could actually take those calories did not burn them nearly as much and stored more of them as fat. Right? This gets into the whole thrifty versus non thrifty metabolism and possibly different genetic markers, etc.

Now our environment is flip flopped. Our environment says hey, we figured this out. So we'll give you food and we'll make it inexpensive and the easier we can make it the more we make, the more we sell, and therefore the issues of where we're at right now.

So his result was if your body genetically does not want to add more muscle and draw Fat, what do we need to do need to train need to exercise you need to give it a reason for adding more muscle and a reason to burn more calories. Again, I know that seems intrinsically obvious. But adaptation, again, in

my opinion, is not something you need to force. It's just something that happens. So you need to focus on providing it the right stimulus.

And yeah, there's a bunch of things you can do to kind of mess up the adaptation process, lack of sleep, low calories, low protein, no micronutrients, etc. But even then you can't really stop the adaptation process. There was some old studies from the 70s, where they put these mice on just a complete overload model. And they use different ways of doing that.

One of the ways they did it is something called a synergistic ablation, where they go into the little lower limb of the little buggers. And they cut up one of the muscles in the lower limb, so that the other muscle has to be active, much, much more, because he's not getting support from the muscle that they cut. What they see in this kind of over load model was they could put the little buggers on low protein diet, they did all sorts of things to him. I think they even castrated one of the groups, they dropped all their anabolic hormones.

I think they obliterated their thyroid, they did all sorts of horrible things to them. And what they saw is that in that leg, right, because we can compare the one leg to the other leg because it did the synergistic ablation only on one leg, the leg that had done on still sub big increases in hypertrophy. So again, we don't want to go around cutting part of a muscle to make another one bigger, but we can provide overload the training, so that the body has to adapt to that. If you provide the right stimulus, you are going to get some adaptation.

Again, there are things that can slow that down that can drop that overall rate of adaptation that you get. I don't think we can drive it to complete zero. Right. And so I think that is hopeful for people. Again, another reason that you should train case you just needed one.

Katie Emerson did a talk on a new level, which is spelled N O, capital L v I, non stimulant nootropic. They did this in I think it was a group of gamers potentially if I remember right, did some different neuro testing from Cambridge brain science and they showed that it did appear to have an increase. So you can look up new level is a raw material from the company nutrition 21.

And her talk was sponsored by them. Next up, Dr. Jason had a talk on a caffeine supplementation, what are the effects of the CYP one A and different genes on para Xanthine and habitual caffeine consumption on resistance exercise and jumping performance? Those was very good talk. I you can look him up on Instagram. I think it's just under a doctor read performance. But we'll double check that and put that in the notes.

And we know that the CYP one a enzymes and this can be tested for genetically affect your rate of caffeine metabolism. So if you look around, you'll see fast and slow metabolizers of caffeine. Reality is it's a spectrum back and forth. And a lot of the newer studies now are subdividing people by genetically. Are you more on the fast metabolizer? Or are you on the slow metabolizer side? And maybe we will get different effects with different amounts of caffeine in these different people.

And history which I think there have not published yet or just past review. They looked at 27 men who did resistance training, they gave them a five milligram per kg caffeine dose, and they were looking at the downstream metabolism of paraxanthin. So paraxanthin is one of the main downstream metabolites of caffeine.

And as a side note, if you listen to my podcast that I did a nice to send last year. Paraxanthin may be a new supplement it has, I think it may have grass status right now. And I know there's more research in that area. Again, the supplement industry is always looking for new and safe stimulants. When I first heard about this from Dr. Ralph Yeager, I wanted to smack my head against the wall, because I assumed that back in the day, when they found this out, the paraxanthin was investigated as effects on its own. It appears it really hasn't, which is kind of surprising how we can just skip a whole area of research.

Again, there were some data, but really not that much. So that might be something to look for. You can listen to the podcast from last year on that. But in Dr. Jason's study, they looked at the fast metabolizers and saw that they did have more paraxanthin versus slow metabolizers.

And so I asked him a question about if we could give people paraxanthin directly as a supplement. Would that be beneficial for fast or slow metabolizers. And we don't know on that yet. But I think that might be something that may be interesting if we're using a downstream metabolite, would that be beneficial if you are a fast or slow metabolizer of caffeine.

So stay tuned for more on that. And if you want, like kind of a one stop shop, of all things caffeine related, we'll put a link in the notes to the ISSN position stand on caffeine, which was updated, I believe it's last year, I should know I was like the third author on it. Or fourth author, I can't remember anymore. But massive, massive amount of work to do that one, I think that took me like on and off for like three years. So I've lost a lot of hair over it.

But open access you can go through, it's broken down by all the different areas where caffeine may be beneficial. So if you want a one stop shop on caffeine that is still relatively up to date, you can look that one up. You'll also find an older one from the ISSN position stand on energy drinks. So as a contributing author on that one also.

Next up, the effects of citrus flavonoids on exercise performance, was this from Yala Stevens, and this was sponsored by bio actor. So they have a specific Citral bio flavonoids, you can look up, what's up.

And they did show that over four weeks, they did see an increase in average power in the supplement group. So it'll be I think, interesting to see over time, is this something we're going to find more data on? What are the effects on that. But if you're looking for other supplements that again, that appear to be grass safe, that are food based, that may be one to check out.

And that was also sponsored by bio actor. All right. So the rest of these might be a little bit shorter. The next one was Anthro cyanine rich supplementation potential for a sport and exercise from Dr. Mark Williams. This one was primarily on black currant, specifically New Zealand, black currant. And some

very interesting data showing that this may have an effect of increasing the use of fat as a fuel source. And I was not aware of this, to be honest.

He posted up a study that they did, which looked at using blackcurrant, so two capsules for seven days. Again, I would have to go back and see I don't think I have the dose on that written down and cycling at two hours around 65% of vO₂ max. They saw an increase of 22% in the use of fat as a fuel. So if you read studies 22% That's so large amount, especially for something that is a non stimulant based.

And it appears that a different lab was able to replicate that I think when they replicated it, it was an increase of around 11% of my notes are correct here. So it's still pretty significant done in two separate labs. And I have a note here looks like I'd have to go back and double check the amount per day Very interesting. We'll try to link to the studies there, so you can read them yourself.

And the private conversation I had with them, he was saying that there's some data on matcha. Tea, also increasing fat oxidation. So something to look for the peers that the compounds in the New Zealand version are better than other compounds from other countries. So they don't know exactly what sub component it is or combination of components. So keep an eye out for that right now, I think it's very interesting. And something I'm going to try to test on my own since I'm one of those Givens that has their own metabolic cart. So I can do at least a couple n and a one or n of a few studies on that, too. So keep an eye out for that.

Next up was the dose response effects of arachidonic acid on primary human skeletal myoblast. This is from Dr. Brandon Roberts. You can find a podcast I did in previous with Dr. Brandon Roberts, it was always good to see him again, fortunately, didn't get a chance to talk to him too much. But that's talked to him a fair amount last year at the President's dinner and you can listen to the podcast that we did.

Also, he gave an update on the podcast, we talked about some of the NSAID findings that they were looking at. And the military was super interested in this because if they were giving NSAIDs to people, like after heavy exercise during boot camp, were they increasing their risk or potentially decreasing the risk or was it neutral. So he gave a brief update on that. And I think they're still working to wrap that up, they'll probably publish most of those results. So stay tuned for that.

But a lot of these projects just to give people an idea of the scope. So the one that he was helping with was a five year project with a price tag of around \$7 million. So these are very large studies, multiple sub studies within it looking at both mechanisms and actual human studies.

In terms of arachidonic acid, if people are listening, arachidonic acid has been promoted as a supplement, you can look up something called X Factor from Bill Whelan, that's going back many years now. The first time I heard of that, I thought it was batshit crazy and made no sense to me. Because all my training said that arachidonic acid was this bad guy. And it was going to dramatically increase inflammation.

And some of the early work said that if you wanted the muscle building effects from it, you wouldn't need to limit fish oils. And so that kind of freaked me out a little bit. But the data that's been presented so far, doesn't really show that at least, arachidonic acid as a supplement is having real big negative effects.

The takeaway here is that maybe one of the studies, those did at 1.5 grams per day, and saw about a 5% increase in lean body mass. Some of the other studies showed about a 3% increase in lean body mass. And again, not all the human subjects studies agreed with each other either. So my takeaway on it from a lot of the great data that he presented was, maybe yeah, I don't know, I'm still kind of on the fence with that, I guess, if you're really trying to eke out the last percentages of muscle growth might be something to play with. But like all things, probably more more studies are going to be needed in that.

So one of the other presentations was from a buddy, Dr. Jonathan Mike. I like big recovery and I cannot why sports supplements you can't deny. And it was a good, I think overall review of some of the supplements that can help with recovery. Creatine, obviously protein, you know, some of the basics ones potentially fish oil.

And one of the little ones you had on there that I'll have to go back and look at some of the data again, was curcumin or tumeric. And I have used it kind of off and on, but I have this weird thing or if you need to put it in a fight ozone or it has such poor bioavailability I always wonder if that's for a good reason or not. And again, I know that's a naturalistic fallacy and that doesn't automatically mean that something is bad, I understand that.

But the data I've seen on it is kind of mixed. But based on his talk, I'm gonna try to go back and look at some of that data again. And I believe he's working on a review paper for ISSN. So keep your eyes peeled for that. As a side note, I had made a note here that I talked to some of the people at the Astra real booth about Astra Xanthine.

And I've used it in the past, potentially, to reduce the risk of sunburn. So I'm very light complected. Generally, most of my life have always burned very easily in the sun, I do kind of sort of get tan, but it takes a long time and very gradual exposure. And over the years, the things that seem to have helped the most are red light. So I have a red light panel I've used off and on for three years, which is photo bio modulation. And then higher dose of Astra Xanthine, I would typically take 10 to 15 milligrams per day for about a week or two before I would go on a kiteboarding trip.

And still, I'm not going out there, you know, just buck naked kiteboarding and going ooh, I took esters that didn't I'm not gonna get sunburned, because that's really stupid idea. We'd generally still wear UV guard, wear sunglasses, etc. But if you're outside in the sun that much, I did find that just the indifferent exposure, you know, when I'm not out in the water, or have my shirt off, pumping up the kite, etc. I didn't appear to burn nearly as easy.

And I've tried that experiment off and on, man going back probably five years now. And so I was just asking them about it. And they said it's anecdotal, there isn't really hardly any data that's been published on it, at least that I can find, maybe I'll poke around again. But they said they've used up to

20 grams per day. And they've heard from other clients similar effects also. So again, not necessarily a recommendation, but if you're looking for things that may help in that area. So I'm gonna keep your, your eyes out on.

We'll go through some of the last ones here relatively fast. Again, there was lots and lots of presentations. So no way I'm gonna be able to cover all of them.

My good friend, Dr. Lonnie Lowry gave a great talk on poly phenols as potential ergogenic and body composition modulators. This is especially talking about the different compounds that are in coffee. So coffee, as you know, is, as Dr. Lonnie says more than liquid caffeine and has other compounds in it that appear to have beneficial effects on physiology.

There's some really good data on coffee reducing risk of Parkinson's, potentially diabetes and other issues, though, people are listening, and they're doing studies on coffee as an ergogenic. Having a control group, as decaf, and even a control group as just warm water might be useful, because we know that caffeine is going to be the main thing for ergogenic performance, but other compounds in there will have other effects too. So I know ducton, Lonnie, and other people are working on a review about coffee for the ISSN journal also, and it was just great to see him hanging out with him again, you can listen to a lot of past episodes that he was on on Iron radio.

Unfortunately, he had to drop off firing radio for the time being because of new job requirements, but always fun to see him hang out, went to the bars one night and just generally had lots of fun. Got to listen to all the new papers and everything he's been reading too. So always great to catch up with him.

Next up was a latest on nutritional ergogenic aids. This was on citrulline and resistance exercise performance. This is from Dr. Adam Gonzalez. So citrulline is in most of your kind of vasodilation or sort of Pump Products. There's two main forms, you'll see one as Citrulline Malate. They take the citrulline molecule and they attach it to malate. The other one is just straight up L citrulline. itself. So L citrulline. is primarily found in watermelon. Although you would need to eat a ton of watermelon To get high amounts of L citrulline. And it's primarily in the rind, which is probably not the part that you are going to eat. L citrulline, by itself is probably the main ingredient.

There hasn't really been a study done yet on citrulline versus malate. We don't really know if Citrulline Malate versus citrulline, if there's a huge difference between those two. So if you're a graduate student kind of looking for a cool study to do, maybe comparing the effects of high dose citrulline to high dose malate, see if there's any difference there.

For reference, depending upon the ratio that's used in the supplement Citrulline Malate, could be a one to one ratio, which would mean if you've got an eight gram dose of Citrulline Malate, a one to one ratio for grams would be L citrulline. Four grams would be maleate. There is also a two to one ratio that's used. So that would be 5.3 grams of citrulline and 2.7 grams of ballet. In all honesty, a lot of times it probably depends upon the price point of the supplement.

And what's going to be cheaper, can't really tell from looking at the label, a lot of times they'll just list it as Citrulline Malate.

The reason for this is that citrulline is participating in the pathways that can help with vasodilation. usually think of vasodilation the supplement in the past has always used as L arginine. There's data how this is pretty old data 15 years ago now that the dose of L arginine, you need to see a vasodilation effect is in 10 to 12 grams, I think, and most people had massive GI issues at that point. So supplement industry has always been trying to find other other ways around it. So the other end of these pathways would be kind of your nitrite nitrate.

Dr. Andy beetroot gave a great talk on nitrates, you can follow him on Instagram for some great stuff. The takeaway of his talk was, you know, nitrates appear to be beneficial for aerobic performance and can probably increase performance within the single digits. But for higher level athletes, that's pretty significant.

Downside is, you're gonna need a pretty high level of nitrates in order to do that. And then a side note, this is also from a talk. I'm blanking on the guy who did it when I presented at the ACSM conference last fall. As a reminder, the again, these are things that I assume everybody knows, but realize unless you're, you know, knee deep and your eyeballs in this space, you probably wouldn't know, if you're using mouthwash and trying to use any nitrate based product.

It's not going to work very good. So the nitrates, ironically to be converted, need to be sort of recycled through the enzymes in the mouth and the saliva. And when you use mouthwash you get rid of all the little critters in there that are converting that. And you'll see this in studies that look at nitrates, they'll say, you know, subjects were instructed not to use any mouthwash. I remember talking to my buddy, Dr. Eric Trexler, about this.

And he was like super paranoid, because I believe he does study on nitrates that the subjects would use mouthwash and would just completely obliterate all of his PhD work. So if you're using pump sort of products that have nitrate in them, and mouthwash, try not using mouthwash. And again, this doesn't have anything to do with holding the nitrates or the pre workout or anything in your mouth. It's just how these how it's Reese sort of recycled through the body and through the fluids. So back to the talk on L citrulline. Different forms I'll say originally versus L citrulline. malate. Or I should say just Citrulline Malate.

Does citrulline actually increase blood flow? Most of the studies have probably been under dosed. For studies he presented showed me not really any result. They did show some performance data, though, that at a high enough dose of Citrulline Malate at eight grams did show some increase in the number of reps that were performed to failure.

And this is kind of consistent with the data on L citrulline. You will see some data that does show performance increase, but not all of it agrees with each other. And in terms of blood flow. From what I've seen, most of the data is pretty mixed. The takeaway there is that it's probably under dosed. Now surprisingly, there's not many studies that have used a high dose so they are hypothesized As in that,

you know, maybe 10 to 15 grams per day of L citrulline. malate. Or even as high as maybe 10 grams, just L citrulline. Might be beneficial.

They're doing, he said an eight gram dose study right now. So hopefully we'll have more data on that coming up in the future. But right now, most of the data is probably under dosed. They did a study that'll be coming out very soon, seven days of using watermelon juice, because it has 2.2 grams of L citrulline. In it did five sets to failure, they looked at some new year's data. So NIRS is like the commercial grade device would be like a Moxie device.

You can look at local muscle oxygenation effects, and they didn't really see much of an effect in that group. So there was a meta analyses that was done. And I believe the effect was positive, but it was very small. So effect size was point to take away of all of that stuff. L citrulline. Still pretty interesting, might be beneficial. But are you getting L citrulline? itself? Or are you getting L Citrulline Malate. Those are different compounds.

And a lot of it may be under dosed as a supplement. One of the other talks I found that was really, really interesting, was from Dr. Marcus Bollman. He's working at IHMC Institute of human and machine cognition in Florida. And what I really liked about his talk was, it's kind of a combination of using machine learning, and looking at just a whole host of data, and different ways we can potentially make sense out of it. Some key takeaways from his talk, is that physiology is a demand based system. Like we said before, with training, you have to place the demand on the system, in order to get a response.

The response to uniform demand is not uniform, meaning and we see this in training studies, we have everybody do the exact same training. And we see the data plot. One of I remember Dr. Stu Phillips presented this, man, it's 2008 ACSM, I think in Seattle, where he showed responses to a hypertrophy training program, and most of the people in terms of lean body mass, we're kind of right around the middle, there's still some variation there, which you would expect to people were liked who standard deviations above everybody else.

And then one poor bastard, technically lost lean body mass during the study. And so that always struck me as huh. If you look at the spread of data, like most people kind of got what they expected as a result, one per bastard got worse, right? So I can't imagine, think it was a 12 week study, doing all that work for 12 weeks, and you technically went backwards. And then two people got these just astronomical results from it. No further research would say, maybe those are extreme responders. Maybe it wasn't the right program for the poor bastard.

Maybe it was sleep, maybe it was nutrition, there's a lot of other things that it could be. But the takeaway is that, even when we place a uniform demand on human subjects, and we try to control for everything as best that we can, the output, or the adaptation of that from a person to person is definitely not uniform. Right. And everybody's seen this where you get a few freaks that just go to the gym and do like the stupidest stuff you've ever seen.

And they get better, right? Which is also probably why following programs from elite level athletes is probably not the best idea. Unless you're an elite level athlete, right? You probably want to look at what

did they actually do to get there. And he also mentioned that it's complex, and yes, we're trying to understand these things, but it's going to take a bunch of time. Something I thought was really interesting was when they were looking at muscle hypertrophy.

One of the theories they had was these non responders or people that don't respond as well to changes in adding lean body mass. Maybe they have some a hyper inflammation at the muscle level, not necessarily at the overall level, not necessarily at like CRP, but at the muscle So itself, these people who are not responding as well do they have inflammation that's just kind of arrived at the muscle level. Now, again, their, their theory was that inflammation is playing a role in some of those people.

They did work out some studies where they were doing training, like three days a week of like a high, low, high, or a very high, high high. And the high, low high, they had an 88% positive result, the three days a week of just high load training, they only saw a 43% had a positive result. So I thought that was super interesting. I got I don't have any data on I'd have to look at what population that was. But this matches, anecdotally a lot of data we've seen throughout time. I know.

My buddy Cal Dietz has published some of this, you can go all the way back to Charlie Francis is training system like high low methods, that most people Yeah, you need to stimulate the system, but you can't stimulate it balls out every single day. Right. And sort of the training template that I've used for God, I don't know how many people now it's kind of my starting point. It's like Monday, Wednesday, Friday, do some type of lifting. Tuesday, Thursday, Saturday, do some cardio stuff, depending on your goals, depending on what you're doing. Monday, Wednesday, Friday may vary. But even at the highest level, only, I found that only really one or two of those days, can you go really, really hard with either high intensity or really high volume of that.

So then they were looking at another study, which was Kathleen Lavin, 2021 using a high low model or high low high model, and responders, and they use the drug metformin. What they found was Metformin blunted some of the effects of exercise. Now, this is highly debatable. I think there's another study that also used Metformin that did show a blunting of exercise effects. But if I remember, right, it was relatively mild. They also presented some information on recovery from a joint replacement.

So they took muscle tissue samples, they took some muscle that was removed surgically, and we're doing different analyses on it. And they found that the more inflamed tissue appeared to be more catabolic. And his the takeaway there was that there may be differences at the muscle level, and the blood level might be perfectly fine. So again, if I remember it, they're still analyzing this data.

And so blood work is definitely useful 100%. And we know that if your blood work is just a floating Trashman fire, by all means, you know, work with your doc get that fixed up. However, there might be more tests, maybe we could look at the blood level in the future to get a wrap our heads around this. But the muscle level itself might be different than what we see actually, in blood levels itself.

I also talked about there may be some decrease capitalization that may lead to anabolic resistance. This matches, if you read a lot of the old Soviet literature of just increasing blood flow to areas trying to maximize that both for recovery and potentially better performance gains, they would would report that

that was the main thing that they would do in some of their training. So this would provide some data that people who have more anabolic resistance where the muscle is not wanting to increase in size as much may have a decreased amount of capitalization to it. So it's literally getting the less blood flow. So again, really, I thought just a really amazing talk.

They're using a lot of just genetic testing, machine learning AI, all sorts of stuff to try to you know, get at some of these very, very difficult problems. And that's my conclusion. There was a whole bunch of other talks too that were great.

As I mentioned, it was wonderful to see so many people there again got to hang out was in nice, sunny and very hot and humid Florida. So if you get the chance to go to the ISSN conference, I would highly recommend it. It will be in June next year, same location, Fort Lot Little Beach, Florida, and we'll be the 20th annual ISSN conference. Usually the fees to go to it are not outrageously expensive either. Everyone there is super nice.

Again, I'd even mentioned that they had like almost a record number of posters there to some students were doing posters, undergrad masters, or PhDs. So just a ton of information, great people would highly recommend it. Hopefully, you've enjoyed this chat about all the latest updates from the ISSN. I'll do my best to put as many of the studies as I can below, some of the stuff we've talked about was only presented at the meeting and has not actually even published yet.

That is the benefit of going to these meetings, as you get like literally the the latest information many times before it is even in print. And as always, this was brought to you by the flextight certification. If you enjoy nutrition and recovery, check out the flex diet, go to flexdiet.com flexdt.com. That'll have all the information you can get on the waitlist for the next time that it opens.

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