

Everything You Need To Know About “NAD”.

TRANSCRIPT

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Ben: Hey, it's Ben Greenfield. I actually found today's podcast episode so fascinating that I had to bring it to you right away in lieu of our normal weekly Q & A, which will be back next week. I think you're really going to find today's episode quite fascinating. It's about NAD+ and the effects of anti-aging.

That being said, let's go ahead and listen to this fascinating episode with three, count 'em, not one, not two, but three guests, on NAD.

In this episode of The Ben Greenfield Fitness Show:

"We checked around various pathways, and it looked like NAD levels were increased with this supplement. Now we thought that that was probably functioning as a preservation of NAD, so it makes sense because of NADs role in being handled efficiently or make the mitochondria in where you're producing the energy." "The NAD business, you know, it's been around actually for many, many years. But because of human greed, it's sort of been kept underground." "Music sounds beautiful. I can really have an emotional response to music. I can really hear all the nuances to it. He responded well, it's because your nerves are revived."

He's an expert in human performance and nutrition, voted America's top personal trainer and one of the globe's most influential people in health and fitness. His show provides you with everything you need to optimize physical and mental performance. He is Ben Greenfield. "Power, speed, mobility, balance – whatever it is for you that's the natural movement, get out there! When you're look at all the studies done... studies that have shown the greatest efficacy..." All the information you need in one place, right here, right now, on the Ben Greenfield Fitness podcast.

Ben: Hey folks, it's Ben Greenfield, and I wanna tell you about an article I recently read in Scientific American. This [article](#) was called "Beyond Resveratrol: The Anti-Aging Nad Fad", and NAD referring to NAD. And what this article includes, among many other things, is, for example, quote, "Recent research suggests it may be possible to reverse mitochondrial decay with dietary supplements that increase cellular levels of a molecule called NAD." And there's another part of the article that says, quote, "The mitochondria in muscles of elderly mice were restored to a youthful state after just a week of injections with NMN, a molecule that naturally occurs in cells and boosts levels of NAD." Well, since that article was published a few months ago, I have received an onslaught of questions about this mysterious molecule called NAD.

And it just so happens that a friend of mine, named [Thomas Ingoglia](#), he knows one of the best NAD scientists on the face of the planet. He's in contact with one of the best NAD clinicians on the planet, both with decades of experience, second to none when it comes to NAD, and I actually consider Thomas himself to be one of the most knowledgeable and frequent users of NAD who I've ever met. He's one of the few guys that's been playing around with it in combination with things like cryotherapy, and blueberry extract, and hyperbaric oxygen, and all these other biohacks that have allowed him to turn completely around from being bedridden sick and losing half his family in a car crash, to being in the best health of his life, including crushing his first Spartan race with me last year, prior to which he actually took high doses of NAD.

And the problem is a lot of NAD clinical researchers seem to mostly be underground at the moment. The FDA doesn't look kindly at NAD supplement companies and integrative doctors who use NAD. They're skeptical of naturopathy, and the first impulse is to turn these type of compounds into patentable drugs because that's a language that the FDA speaks, and NAD can be dangerous. I've spoken with Thomas and he knows a guy personally who has poisoned himself while using NAD incorrectly and hospitalized himself with the same substances we're gonna be talking about in this podcast episode.

So, yeah. You need to proceed with caution and with the type of formal clinical information that Thomas has opened my eyes to, and Thomas is actually on the call with me today, but I don't just have Thomas here with me today. Along with Thomas, first of all, we have [Dr. Ross Grant, PhD.](#), and Dr. Grant is one of the most prolific authors in the field of NAD, and he specializes in the effect of NAD on the brain. He's been researching it since 1994, back when nobody was doing NAD research. He's the clinical associate professor at the University of Sydney Medical School, and the CEO of the Australasian Research Institute, and a biochemical pharmacologist himself. So he's a smart cookie, and he specifically researches NAD and its role in oxidative stress, and the human cellular response to oxidative stress and how NAD affects that. And in addition to Dr. Grant, we're also, as if that weren't enough, joined by [Dr. Philip Milgram](#), who is an M.D., and Philip Milgram is based out of the NAD Treatment Center in San Diego, California, and he specifically helps people in recovery from addiction using NAD protocols.

So, between Dr. Grant, Dr. Milgram, and Thomas, we have quite a few folks who specialize in NAD. So if you're curious about this stuff, you are in the right place. Now before I jump in, and I'm gonna jump in starting, with Thomas, and Thomas telling us his story and how he first kinda discovered NAD, I wanna tell you that all the show notes for everything that we're gonna talk about, including a link to that article that first kinda sparked my own interest in this, you can find at bengreenfieldfitness.com/nad. That's bengreenfieldfitness.com/nad. So, with that being said, let's just go through here real quick so everybody can know everybody else's voices.

Dr. Grant, welcome to the show and thank you for coming on at 4 A.M., Australian time.

Ross: You're most welcome, Ben.

Ben: And Thomas, welcome.

Thomas: Thank you, Ben.

Ben: And finally, Dr. Milgram, welcome to the show.

Philip: My privilege, Ben.

Ben: Alright. Well, fantastic. Well, Thomas, like I mentioned, you're the guy who kinda first became my outlet into the wide world of NAD. So tell me a little bit about how you first discovered NAD, and how you got to the point where you were kind of dug deep into a health hole, so to speak when it came to needing some serious healing.

Thomas: Well, I'd like to start by saying that this all really began when I lost half my family in a car crash a few weeks after I lost them, old friends to drugs and alcohol, I had a friend who knocked on my door the day that he killed himself, and he had abused drugs, and he had severe psychological problems because of it. But I had lost my dad, and my brother, and my nephew instantly in a head-on collision, and it was very hard for me because I was chronically ill for about seven years. I was suffering from what doctors called Fibromyalgia and Chronic Fatigue Syndrome, and I took opiate drugs at that time.

My illness was brutal. I spent a lot of time in bed. I had trouble standing for periods of, let's say, over 45 minutes. I was very sick. I would get headaches, there were so many different symptoms that I had, and I was very fatigued all the time. And going to the funerals, because we had a funeral in Costa Rica, and I had to go see my mom in Hawaii where the accident took place, the car crash, it was just, it was very hard on me, and I was very angry. And I made a point that at the funeral, to myself, that I would do anything and everything to cure myself.

Ben: So, do you know what exactly it was that was causing you to be in a position where like you couldn't stand up for 45 minutes, or for more than 45 minutes? Or what exactly the infection was?

Thomas: Well, it's crazy because when people ask me, I'm forced to tell them that, you know, I don't know. I mean, the Mayo Clinic couldn't figure out what was going on. I do know that there were some tests for Lyme that showed positive results. I do believe I had a lot of the symptoms for antibiotic adverse reaction, and I put some of the claim on that. And then also, there's a concept called opiate-induced hyperalgesia which is this idea that longer term use of opiates will cause pain throughout your body. So, you know, I think it was probably sort of a mixture of those things, and we can go down a rabbit hole on this great deal and I'd rather, maybe save that for another time, but needless to say that it was a nightmare, and I was looking for something that would be beneficial for me, no matter what I had.

Ben: So you were more or less addicted to opiates and extremely sick?

Thomas: Yeah, and tired.

Ben: Okay, and so what did you do from there?

Thomas: Well, I was up late at night in one of my support groups, and someone would mention NAD, and I was like, "Okay. I'll give it a shot." And I called Springfield Wellness Clinic, which was the longest running NAD clinic in the country for 15 years. They may have treated over a thousand patients, and they told me, "You know what? We have a place in San Diego where it's being done." And so, I was like, "Great! I live in San Diego." So, I started the treatment and it's intravenous NAD+, and that's very important that you get the right molecule. It's not NADH, which is completely different.

Ben: Okay. So, when you say intravenous, you're actually getting this stuff injected?

Thomas: Yeah, it's into your vein. It's a lengthy treatment. I ended up going for 12 days. It might be like seven hours a day, and then I was a noisy patient, I was not easy to be around. They asked me to give up opiates and I was scared and, you know, just kind of grumpy. But after that, about the day

seven, the day nine, things began to change. I remember Anne Rogers saying, “Your eyes are shining. You’re changing. I can see it,” and I was a little bit surprised that she could see that I was changing physically, and that happens to quite a lot of chronically ill patients. Their face and cheeks just start to get color, it doesn’t happen with everyone, and then a day later, they get more color and gloss in their eyes. Their eyes no longer look, like dull. So...

Ben: I mean, I’ve done IV injections before, like Myer’s cocktails where you get high dose [glutathione](#), and vitamin C, and a host of different vitamins, but with this NAD, is it just NAD that you’re injecting when you do something like this intravenously? Or are you including other things like vitamin complex, or things along those lines?

Thomas: You know, the NAD doctors that are involved with the Mestayer model, where Mestayer is the doctor in Springfield. They worked to customize the protocol, her patient, and so, other things that you might see in Myer’s cocktails might be added at some point, just so you know that the supplements aren’t mixed in the same bag.

Ben: Okay. Gotcha.

Philip: Let me jump in real quick. There are definite protocols that Dr. Mestayer from Louisiana has worked on, and we’re also working on on improving and yes, it is similar to getting Myer’s cocktail. It’s an intravenous slow drip at the rate that the person can tolerate it, and then we add other minerals, and we individualize the treatment according to testing and what the patient’s personal needs are to enhance the NAD experience. The NAD is the most active ingredient but we use these other compounds, because there’s an art to this, it’s not just starting an IV and running NAD in.

Ben: Okay. Gotcha. Now, I do wanna definitely ask you about some of the protocols that you do there Dr. Milgram, but back to you Thomas, in terms of starting into this, you’re literally saying within days of beginning NAD injections that your health completely turned around?

Thomas: Yeah, I mean, I remember being in the ocean, swimming in the ocean about a week afterwards, and I just remember looking around and everything I sensed was just richer and full of more color, and my pain went down by 50% in the first 10 days of treatment, and then I started to go down further over the next six months and a year, and it said it might be beneficial to keep coming in every so often to get a booster, and I was diligent in doing that. And I felt healthier, and less pain, and more energy, you know, every time I came in. So...

Ben: Interesting.

Thomas: At that point, I went back to old doctors and just sort of talk to them, and some of these doctors were like, they said, you have no idea what you just stumbled upon. We just came to a conference, we were just at a conference, I was just talking about this, and you should pursue this and then they gave the whole “you-should-go-to-medical-school” thing, but it was really motivational, and they encouraged me go to medical conferences which I did, and I got the same responses that these integrative medical conferences that I went. And I also remember meeting with a scientist who was

working in the NAD field for coffee, and he asked me about my story. I remember telling him, I was like, “You know there’s one thing that I gotta tell you about, and that’s the music sounds beautiful. Like, I can really have an emotional response to music. I can really hear all the nuances in it.” And he responded, “Well, it’s because your nerves are revived.”

Ben: Wow.

Thomas: I dissected mice on NAD and we noticed a difference in their nerve connections to their ears, and I don’t know, I was sort of, at that point, that was incredible. But it was six months after I did the NAD that I saw the article by David Sinclair. Well, I saw it in Time magazine, the journal article he did and so, at that point I was like, “What did I stumble upon?” They’re using a precursor, and we’re using, you know...

Philip: The actual NAD.

Thomas: The actual NAD. Yeah.

Ben: Okay. Gotcha. So there is a difference, I know, and I wanna delve into that here in a moment, but Dr. Milgram, in terms of you and your story, are you the person who Thomas actually hooked up with, in terms of his first experience with NAD?

Philip: Yes. He hooked up with this lady that I worked with together with Dr. Mestayer in Louisiana, and her name was Anne Rogers, she was looking to bring it to San Diego, and she found me as an addiction medicine doctor, and also somebody interested integrative medicine and nutrition, and individualized medical care with metabolic nutrition, and just serendipity, she found me. I’ve been doing addiction medicine for 25 years. I’ve been in treatment myself for opiates, in recovery since March 23rd, 1988. Then I studied intervention with Vernon Johnson, the guy that invented intervention back in 1991, and I’ve dedicated my life to this because this really changes people’s lives. I’ve been involved in Tom’s therapy, I was trained by Dr. Mestayer in Louisiana, and who’s been doing it since 2001, and then I’ve been involved with administering NAD to Tom, yes.

Ben: Okay. Gotcha. And you yourself, if I’m not mistaken, didn’t you used to have some kind of like addiction issues that you overcame with NAD as well?

Philip: I didn’t overcome them with NAD. I’ve been medical director of several detox places but originally, I was just exposed to the old, white knuckle type of detox where they prescribe high levels of drugs to counteract withdrawal symptoms like valium, benzodiazepines, and other heavy duty drugs, and I’ve been doing that for 25 years. When we came to NAD, it’s a game changer. There’s virtually no withdrawal symptoms, the hyperalgesia is decreased, and...

Ben: What’s hyperalgesia?

Philip: What Tom referred to that opiates, in a way makes it a cycle that makes you use more opiates. It actually increases your sensation of pain, then you require more opiates.

Ben: Okay. Gotcha.

Philip: It's a vicious cycle.

Ben: Gotcha. How is NAD actually breaking addiction? Like how does this work?

Philip: Well, I can't give you the answer in 25 words or less, but it actually works at the epigenetic level to decrease withdrawal symptoms. Okay? It also works at the mu-opioid receptor level to decrease this exaggerated response of pain through the sodium and calcium-gated channels. And it also decreases anxiety by having an effect on the bundled up chromatin that comes from lack of NAD.

Ben: Okay. So someone who's like anxious, who's having withdrawal symptoms, and who has like a chemical addiction to opiates. It's working on all three of those different platforms to decrease the addiction to opiates, and let me know if I'm correct about that, but also decrease addiction to other substances as well?

Philip: Yes. And in fact, it has the greatest effect on alcohol addiction. It's amazing. It actually acts at the metabolism and genetic expression of alcohol predisposition. Again, I can go as deep into this as you'd like.

Ben: Well, what I'm curious, I guess the first thing and I'm sure a lot of our listeners are wondering this too, and perhaps this is a question for you, Dr. Milgram, or for Dr. Grant, but what exactly is NAD? Like, what is it and what does it do?

Philip: Well, it's like we're on a phone call talking about relativity, and we have Einstein on the phone with us. Why don't we have Dr. Grant, who's one of the world's experts on this, how he answers this question.

Ross: Yeah. Look, I'm happy to make a few comments and I'll try and make them fairly brief, but NAD probably, is what could be considered one of the master regulators of cell metabolism and often when people talk about different molecules having this amazing impact, they're often sort of talking at a level which is on molecules functioning at a fairly high level in a cell. But here, we actually do have a molecule which is fundamental to the way the cell functions, and its levels as it goes up and down has an influence on multiple different areas. So NAD itself, I mean apart from the clinical benefit as Dr. Milgram has talked about, and obviously Tom has experience, but at its fundamental level it's actually involved in a number of different things.

It's a co-factor, which we've known for many decades now. So, you know, alcohol dehydrogenase as you need NAD, in fact it's the NAD that runs out when people are trying to metabolize alcohol, and so they're ending up with high levels of alcohol as a result, but it's needed as a co-factor. Another one is to lactate dehydrogenase, et cetera, which is also involved with that buildup of lactate, when you're using your muscles. It's an electron transporter. Now what that means is that you need to, when you're turning the food you eat into the energy that the body needs to the muscles, et cetera, you need to be able to transfer the electrons from that food that you took down, what we call a respiratory chain in the mitochondrion, and that's how we generate the energy, ATP.

Ben: Okay.

Ross: NAD is critical for that. You know, it's also needed for DNA repair, so, our DNA is getting damaged all the time, and I guess we'll talk about aging a little bit later on, but it's a really important molecule. Well for now call a substrate, so it's actually used up by the enzymes, or one of the key group of enzymes, there are a number of them, but basically it repairs particularly, and it's actually used by those enzymes in order to help prepare the DNA.

Ben: So, your body makes NAD on its own?

Ross: It makes NAD on its own, and it makes it from a few different precursors. So I know that was mentioned before, about nicotinamide mononucleotide or NMN, but there's a number of precursors that it can actually make it from. It can make it actually, originally also, from the molecule tryptophan, which is an amino acid people would have linked up in their minds to things like serotonin, which is one of these neurotransmitters, but happy to get into that a little bit later on, the epigenetic signaling its involved with as we know, the switching on and switching off genes by changing acetylation patterns, and these are sorta linked to people might have heard in a sort of aging medicine, or aging sort of like chemistry with the sirtuins, and NAD is a precursor to that, so sirtuins might be important.

And I guess a lot of the enthusiasm about resveratrol is the fact that it was theoretically driving sirtuin activity. What's interesting is that sirtuins are like a factory, like any enzyme, they won't function unless they have, if you like, the raw material for that factory to work on, and NAD is that raw material.

Ben: Okay. Gotcha. Now, I took physiology in college, like physiology and biochemistry, and what we were basically told was that NAD, or this nicotinamide adenine dinucleotide was basically, all it does is it carries electrons, right. Like it's involved in redox reactions in the cell, and you basically have it, this NAD⁺ gets an electron from other molecules, it gets reduced, and that makes this stuff called NADH, which then can donate electrons, and it's just essentially one of the ways that the human body kinda keeps working as a giant battery. We never learned about any of this stuff regarding like anti-aging, or addiction, or it acting on these sirtuin pathways you're talking about, and so, I guess that's my first question, especially after hearing you and reading this Scientific American article about how this could be the new anti-aging drug of the future. How exactly is it working when it comes to NAD? I know that you just mentioned this sirtuin pathway, and I know that's intimately involved with aging, so can you go into, not only what this sirtuin pathway is, but what's the proposed mechanism between, or as to how NAD would actually help someone when it comes to anti-aging?

Ross: Yeah. I mean, it's a very good question and all of the answers aren't known in here. What we do know is that when it comes to aging, so if you think of what's actually happening when somebody is aging, they're actually getting an accumulation of damage within the cell, and that accumulation of damage particularly around the DNA, is affecting the way those cells function and therefore the way the organ functions. And a couple of the key things that characterize aging is that part from the cumulative damage is also this decrease in energy, and just a decrease in what we might call the viability of the cell.

So very simply, where does NAD set in? NAD, we know, can improve energy efficiency because one of the key things that's needed in order for the mitochondrion to work well, in order for the energy to be produced, is that we need to have an efficient supply of these NAD molecules, as you said, to be able to transfer those electrons so that we end up having a mitochondrion being able to convert literally the energy we take in, mix it with the oxygen that we also breathe, and finally produce ATP at the end. If you don't have NAD, the mitochondrion doesn't work. Therefore, you don't generate the energy.

Now, at the epigenetic level, then we have again NAD as a master regulator at that point. If NAD levels drop, then the epigenetic switches, and people would be aware that now we know we have methylation patterns, and acetylation patterns, and what these are is just molecules that set on and off, both the DNA as well as the chromatin that sits around with the proteins, to allow the genes to either be switched on or switched off. If you've got lots of NAD around, it is able to switch on, so sirtuins act, they deacetylate things, and they're able to switch on pathways that are linked to improving cell viability, and in other words improving the health of the cell. Now, remember this is at a global level, so it's not just happening in one organ, it's actually happening across the body, including the brain, as well as the muscles, as well as other tissue. And so this increases things like a radio oxidant production, and basically keep cells working in what we would consider to be a younger state of metabolism.

Ben: Okay. Gotcha. So essentially all we're doing is we're allowing our mitochondria to function more efficiently when we have adequate NAD, and we're also fighting a lot of the oxidation that could cause aging, but by giving our body extra NAD via something like the intravenous injections that Thomas and Dr. Milgram were talking about, we're not just able to, for example, fight off some of the bad things that can happen when we're addicted to a substance, but we can literally activate these anti-aging pathways.

Ross: Correct, and I guess the other important thing is that it looks like we were able to increase the repair of DNA that might get damaged in the course of normal metabolism.

Philip: Ben, can I chime in here?

Ben: Yeah. For sure.

Philip: I've got a list, you know, I want you to get out of thinking that it's just NAD to NAD+ in the Krebs cycle. That's what we learned, making ATP. That's what we learned back in Biology 101, but this is much greater than this. It's an epigenetic co-factor in blocking over-reactive genes that are not being expressed properly.

Ben: So what do you mean by that?

Philip: In histone acetylation, methylation, phosphorylation, and DNA methylation, and micro RNA, it has an effect to allow the histones to get tightened up in the chromatin, and of course, very greatly simplifying this, and the NAD actually helps unbundle this. Though it actually works to remodel your chromatin by its effect on these sirts and the PARPS, it actually affects DNA repair. It affects the CD38 gene for increasing immune function. It causes the mitochondrial biogenesis. It increases the production, and effectiveness of each individual mitochondria. It actually offers a neuroprotective

device qualities protecting the nerves from demyelination and other things. It being explored at Harvard for use in ALS, multiple sclerosis, Parkinson's disease, Alzheimer's disease. It also again, it's very important that the sensation of pain by the gated calcium and sodium channels, the voltage-gated chain, the NAD helps that function properly so you don't have this hyperalgesia. It may act itself as a neurotransmitter, and it has an effect on autophagy.

Ben: Really? So it can also act as an actual neurotransmitter?

Philip: That's still being studied. That's sort of nebulous, probably beyond the scope of this discussion.

Ben: Okay, but basically it could potentially be involved in like cell-to-cell communication?

Philip: Yes.

Ben: Okay. Interesting.

Ross: Yeah. And I can jump in there and yeah, it certainly support that, it looks like NAD probably does serve as a neurotransmitter by systemically as well as in the central nervous system.

Ben: Interesting. Okay. So, this Scientific American article it, obviously, based on some of the cool things about NAD that you guys have just talked about, it goes into how there's a lot of different NAD sources being created right now. Like there's this stuff called Niagen. There's something called Basis by I think a pharmaceutical company Elysium. They talked in this article about things that can assist with your body's own production of NAD, like [resveratrol](#), that we'd find in red wine or in supplement form, or something called pterostilbene. Can you help us cut through all this clutter, Dr. Grant, as far as what the best way is to actually get NAD into our bodies, and what exactly the status is as far as the development of pharmaceuticals or the development of supplements?

Ross: Yeah, sure. Look, to get it into the body, and this is one of the reasons why clinics like Dr. Milgram's and Dr. Mestayer will use IV NAD, if you want to get NAD into the body efficiently, what we call a 100% bioavailability, you know, when it's all getting in, then the best way is to take an IV. The unfortunate thing is, and even though there's a lot of work that needs to be done still in this area, it looks like if you take NAD orally, and I've seen supplemental tablets for NAD out there, but taking it orally, unfortunately, you're pretty much not going to absorb it across the gastrointestinal tracks. So from the stomach and the gut, you're not gonna absorb NAD very efficiently. So, to what to get NAD up efficiently, it's intravenous.

Now, there are a few other ways in which the body can actually make NAD, so that what we call precursors, and you mentioned one of them, niagen. Niagen's a fairly new one, and that was identified actually originally from milk in around about 2007, but that is called [nicotinamide riboside](#). And nicotinamide, yeah, nicotinamide riboside actually gets converted into NMN, which is one of the other precursors that are also available, the one you talked about in one of the other article. So you can get those two, and those two will be absorbed across the gap. So you can get effectively NAD increased from taking those orally.

The other two ways of getting them is by the classic vitamin B3's that you'll get from over-the-counter at the drugstore, and that would be nicotinic acid which is the acid form of vitamin B3, and this is the one that the...

Ben: You said B like boy?

Ross: Yeah, B like boy.

Ben: Okay.

Ross: So, vitamin B3. So the nicotinic acid form is the one that's been used for actually quite a few decades now to reduce cholesterol. It's the one unfortunately that has a side effect that gives you flushing. We can talk about why that happens. But then the other molecule that you'll also get, again across the counter and in many supplements, is the amide form called [nicotinamide](#). Now, you'll notice that NAD is nicotinamide adenine dinucleotide. So that is the nicotinamide version. Now nicotinamide can also be, what we call, recycled. It's in what we call the salvage pathway. It can be recycled through to NAD. The negative thing with having too much nicotinamide, as opposed to the other types of NAD precursor that I've mentioned, is that nicotinamide is a byproduct. Now, you've heard we've talked about CD38, we've talked about sirtuins, and talked about the PARPs. So CD38, the immune modulators, the Sirts, the epigenetic modulators, and PARPs, the DNA repair enzymes. Now all of those three, when they use NAD, they will actually generate nicotinamide as a byproduct.

Ben: Okay.

Ross: And the important thing about that is that that nicotinamide, as the levels start to go up in the cell, the nicotinamide starts to inhibit those enzymes, the CD38s, the sirtuins, the PARPs. And so too much nicotinamide, unfortunately, can stop the very reactions that you want to have acting.

Ben: Interesting. Okay.

Ross: So, we would probably suggest that getting it from some of the other sources, the nicotinamide riboside, NMN, or nicotinic acid would be better.

Ben: Okay. And the NMN, is that something that one can, for example, purchase in like a supplement form, or this [nicotinamide riboside](#)?

Ross: Both NMN and nicotinamide riboside can be purchased.

Ben: Okay. And the absorption of those in the gut is sufficient to actually increase NAD levels inside the human body?

Ross: Yes, they do. And there has been some studies in animals particularly, in fact we're in the middle of preparing to conduct what we call a head-to-head on these so that we can see which one is actually the better one. And most of them there is evidence that both of them will significantly increase NAD. We're probably favoring the riboside at the moment as opposed to the NMN, but both of them seem to be able to do it.

Ben: Okay. So...

Philip: And again, Ben, it's dose related. You know, think of the breakdown of nicotinamide adenine dinucleotide into nicotinamide and adenine, okay? That reaction of breaking the NAD down to nicotinamide is where the Sirt and the CD38, and the PARPs are generated and activated. So if you have too much of the nicotinamide, it can actually force that to not happen. So I would say like people that are taking too much nicotinamide is probably not a good idea.

Ben: And how much would be too much? 'Cause if you look on like Amazon, right, like if you go to Amazon, you do a search for like nicotinamide supplements, you'll find like NOW Foods, and Life Extension, and all these other companies selling like 500mg capsules of nicotinamide, like that's about the dose you'll see in a lot of these. When you say, "If you take too much, you're gonna shut down those positive pathways that you're trying to activate," how much would be too much if someone were just gonna like try to get a nicotinamide supplement from one of these companies?

Philip: Well, usually they come as 250 or 300mg, and they suggest two a day, and I think that's the proper dose. But people will think, "Oh, wow. If a little bit is good, a lot is better," and they're taking more than that, I think they may actually be doing themselves disfavor.

Ben: Okay. So once you're exceeding, like close to about 600mg, you're saying that that could be Bad News Bears?

Philip: Correct. Just like too much vitamin D.

Ben: Okay. So, nicotinamide, we can buy nicotinamide, also known as NMN supplements on a website, like Amazon for example, from a good company, and we could take anywhere from 300 to 600mg of that to activate some of these anti-aging, or antioxidant pathways, or new mitochondrial-building pathways. Now this nicotinamide riboside, which is not the NMN form, is that also something that you can find in supplemental form?

Ross: Yes, you can find nicotinamide riboside as a supplement, and nicotinamide riboside, like NMN, will be converted through to NAD. In fact, nicotinamide riboside is converted first to NMN, and then through to NAD, and for reasons that we still don't understand, it seems to be [0:41:35] _____ way of getting there, and you can take, unlike the nicotinamide, which is actually having to be recycled through the pathway, and it recycles through NMN as well, but nicotinamide riboside, you probably can take up to, I would think, easily 500 to even possibly 1,000mg a day without too much concern 'cause you're not gonna be generating nicotinamide directly. If you're supplementing with [nicotinamide](#) on its own, so that's the vitamin B3 that's often out there, if you supplement that on its own, you're already increasing the body's nicotinamide, and that's doing the inhibition. But taking the other two, the NR, the nicotinamide riboside, or the NMN, neither of those will produce nicotinamide until it goes through NAD.

Ben: Okay. Gotcha. Now this article for example, the one in Scientific American talked a lot about resveratrol, which you find in wine, and the fact that resveratrol can kinda like rev up the sirtuin

pathways. And when we rev up the sirtuin pathways, we can do things like form new mitochondria, or keep mitochondria running smoothly. Now, when it comes to resveratrol, is that something that you would take in conjunction with something like NAD injections, or one of these nicotinamide supplements, or is that something that one would use on its own? What are your thoughts on the use of something like a resveratrol supplement?

Ross: Yeah, I'm happy to make a comment. I think that there is some positives with certainly the antioxidant effects that come from the stilbenes, which resveratrol is one, and...

Ben: What'd you call, the stil, the pterostilbene?

Ross: Yeah. The pterostilbenes. They're a class of molecules that are what we call in the phytonutrient class. So, there's mention of them coming from things like the skin of red grapes, and from blueberries, and in fact, you even get them from things like peanuts, et cetera.

Ben: Is that why Thomas that you told me that you were using like a [blueberry extract](#) in conjunction with your NAD injections?

Thomas: That was just something that I had originally gotten from a brain conference that I went to, but as soon as I found that out, yeah, I'm very pretty religious on taking my blueberry extract.

Ben: Okay. And that's because this pterostilbene that Dr. Grant was talking about, you're gonna find that in addition to resveratrol in things like blueberries, and grapes, and dark purple, and blue type of fruits, or berries?

Ross: Mhmm.

Thomas: Yeah.

Ben: Okay. Gotcha.

Philip: And we've found that NAD really is the most important thing to increase your Sirt 1 through 7 activity, but resveratrol specifically, you need that for Sirt 2.

Ben: Okay. Gotcha. So there's different sirtuin pathways that are activated by different forms of supplements and you would, for example, take [resveratrol](#) in conjunction with NAD to get the best of both worlds.

Philip: Correct.

Ross: Yeah. Though theoretically, there seems to be a fairly good benefit. I mean all the sirtuins need NAD, some of them get switched on a little more efficiently than others in different parts of the cell.

Ben: Now, in terms of the best delivery mechanism, it sounds like intravenously that you can really get very, very high levels of NAD compared to some of these supplements that we're talking about, but how much of a difference is it? I mean, are we talking about like a night and day difference between intravenous injections versus someone using a supplement, like a resveratrol mixed with an NAD

supplement? Are we talking about a slight difference? I mean, in terms of comparison between intravenous delivery versus oral delivery, how do these different delivery mechanisms vary?

Thomas: In my personal experience, I just think that intravenous NAD is, you know, I haven't seen anything that's like it in comparison.

Philip: Let me respond on a clinical level. You know, we suffer from lack of NAD because we're using it up and not replenished in proper levels, and it's the cause of underlying aging, and other disease processes. So I think that you have to sort of flood the body with NAD to start off with, but then you can supplement, and that's why we use intravenous. Then you can supplement NAD with a pure source of NAD that we give intranasally that I think is a very good method of continuing to substitute to boost your NAD levels.

But, you know, the NAD business has been around actually for many, many years. But because of human greed, it's sort of been kept underground. People wanted to make money on it, so they called it different things. They called it Coenzyme 1, they called it amino acid therapy when Dr. Hitt was doing it down in Mexico. But then it was analyzed by Dr. Mestayer and his friends in Louisiana, and found that the active ingredient was actually pure NAD. And they now have the pure source of, you wanted NAD that doesn't have a contamination in it, you want it so that it has a high level, it's not very stable at room temperature for a prolonged period of time, so it has to be gotten fresh, and be made up fresh and used quickly, and that's why we have these protocols, and then we also use it with other nutrients to individualize therapy for people's individual needs.

Ben: Okay. Gotcha. So, in terms of other things, are you talking about things aside from like blueberry extract and resveratrol that play well with something like NAD when it comes to the anti-aging or the addiction mitigating effect?

Philip: Correct. Not only that we need to add things to enhance the NAD experience, and we know what those are, certain minerals and, but also, it seems like a lot of the things that we've been doing for detox for years actually go and work against these...

Ben: Like what?

Philip: Like benzodiazepines. We do not give benzodiazepines when we do NAD therapy.

Ben: You mean like valium, and stuff like that?

Philip: It's like anti-NAD.

Ben: Would that be, for example, like a valium?

Philip: Valium, Xanax.

Ben: Okay. So basically, a lot of these will actually have an effect that inhibits mitochondrial function?

Philip: Correct.

Ben: Okay. Gotcha. And what are some of the things that combine well with NAD? You mentioned minerals as one.

Philip: Well, magnesium, calcium, potassium, but we also handling the side effects, there's drugs that we use and drugs that we don't use that we've found to not inhibit NAD, but decrease some of the withdrawal symptoms, and enhance the NAD thing. I mean, we've developed this over the years. Dr. Mestayer has been working on it, and we've develop these and increased these even more.

Ben: It's really interesting because I did a podcast with a guy named Dr. David Minkoff a few weeks ago where we talked about cancer and mitochondria, and anti-aging, and it seems that a lot of this kinda overlaps in terms of, you know, we spoke of hyperbaric oxygen therapy to enhance oxygen availability for enhancing mitochondrial function. I mean, I know that's something that Thomas, you told me that you had experimented a little bit with. I've talked about cold therapy, and cold thermogenesis for enhancing mitochondrial function and the amount of nitric oxide that you have in your body.

You know, you guys are now bringing up other ways to enhance mitochondrial function such as mixing NAD with resveratrol, with minerals. It seems to me that when we're talking about like anti-aging, that there are all these different things that seem to kind of be going after the same effect, which is, more or less, improving mitochondrial health, while also improving the ability of DNA to repair, in the case of NAD. But I know that, and I have a question for Dr. Grant actually about this, I know that the effect of this stuff can go beyond anti-aging and, for example, could kinda reach into the realm of fitness, which I think a lot of our listeners might be interested in. As far as the research on NAD and anything such as VO2 Max, or lactate tolerance, or time to exhaustion, or anything like that, Dr. Grant, have there been studies on NAD, and how it affects the actual fitness or exercise performance?

Ross: There's been very few and I suspect that that's going to rapidly change. We're involved in a study a little while ago now where we were looking at the influence of a particular supplement that was being provided to athletes, and seeing what the effect was, that will be getting a 15% improvement in what they called 'Time to Fatigue', as you've mentioned, so they could exercise about 15% minutes longer, and it was the exercise physiologists who brought the problem to our lab, and asked us to have a look, and see what we thought could be the issue.

So we checked around various pathways and it looked like NAD levels were actually increased with this supplement. Now we thought that that was probably functioning as a preservation of NAD. So it makes sense because of NAD's role in being able to efficiently or make the mitochondrion where you're producing the energy, where you're making that happen efficiently. And, as I mentioned, with lactate dehydrogenase being able to convert that more efficiently through the pyruvate. So increasing NAD, it makes sense that you would have the potential for increase in fitness.

Ben: Okay. Gotcha. So, what they're saying is it may improve time to exhaustion by somehow working on the ability to turn over lactic acid more quickly, but it's not actually something that's been fleshed out in actual human research?

Ross: In great detail.

Ben: Okay. Gotcha.

Thomas: But then also, by acting through specifically the Sirt1, we found some of the things that you and your experience have shown to increase, improve the human condition. Things like fasting, mechanically stretching muscles, exercise, low glucose diets, proper circadian rhythm sleep cycles, actually act to let the Sirt1 and the NAD work properly. And that's why they work, it works through the NAD and Sirt pathway for these things that you can do to be a healthy person, that's why they work. A lot of the better diets, the ketogenic diet, Atkin's diet, Paleo diets, that's how they work, they also work to increase Sirt1.

Ben: Right.

Ross: And that's true, and the good thing with an activation of things like Sirt1 is it looks like we'll end up getting an increase generation of mitochondrions. You actually increase the number of mitochondrion as well as the efficiency of energy productions. So, it [0:53:01] _____.

Philip: And especially in the brain.

Ross: Mhmm. In the brain and in the muscles as well. But, yes, certainly both.

Ben: We're talking now about, like, you know, some different lifestyle strategies that could, for example, enhance these Sirt1 pathways, you know, in a similar way as NAD, such as some of the things you were talking about, like ketosis, we mentioned calorie restriction, we mentioned cryotherapy, hyperbaric oxygen chambers. What are some of the best ways to actually raise NAD levels naturally with other food strategies, or other lifestyle strategies, or other biohacks, for example?

Ross: Yeah. Look, I'm happy to jump in there with some of the lifestyle elements, which I think are particularly important. If you want to turn over your NAD fast, in other words, if you want to drop your NAD, which is not what we're gonna do and I'm just using that, then you're gonna have any condition which has an increase in inflammation and what we call oxidative stress, or free radical damage. Both of those, not only does it signal through to increase the CD38 activity, but it also increases PARP activity, which is the DNA repair. So inflammation, free radical damage, both of those are gonna decrease your NAD, which is what you don't want.

So, very simply, any of the lifestyle behaviors that are going to improve that is going to increase your NAD naturally. And this includes taking in less calories, we know that using whole foods and some of the work in the brain that we've done which is interesting, showing that the carotenoids particularly, so these are the molecules that are coming from the red, yellow, and green leafy sort of veggies, these are particularly high in carotenoids and these can actually help preserve, particularly in the brain, NAD levels. Exercising, eating whole grains, I mean these are gonna be able to provide things like your nicotinic acid and vitamin B3, et cetera, on their own. But all of these, essentially doing those things that you'd be [0:54:52] _____, most people would recognize were healthy for them is going to help to increase their NAD and maintain high NAD levels, and therefore high sirtuin activity, et cetera.

Ben: Okay. Gotcha. What about light therapy? You hear a lot about like infrared light and your infrared intranasal light, things along those lines, how about light? Does it play a role here?

Ross: Look, I don't know, nobody's done any work on that directly, as far as I'm aware, not specifically with NAD, but there is work that's been done on light therapy of different wavelengths, even through the blue wavelengths decreasing inflammation within certain parts of the body, particularly in people with pain. So, where there's benefit that's there, and I guess there's still a lot of work still going on there, that photomodulation, that if it's going to decrease pain, which is associated with cytokine signaling and increase in inflammatory cytokines drive or increase your pain, then there is going to be benefits with NAD. And that probably works both ways, so the higher NAD is able to shut down some of those pathways.

Ben: Okay. Gotcha. What about you, Thomas? I know you've experimented with some things when it comes to enhancing your response to NAD therapy and supplementation. What are some ways that you're using food or lifestyle strategies to increase your own levels of NAD?

Thomas: Personally, I had a very substantial decrease in pain and a very strong uptake in energy in that 12 days I initially did NAD therapy, but I wasn't a 100% back to recovery and so, I was still desperately trying to make some changes and I think, sort of accidentally, I was really cutting down on my caloric intake, I was eating more vegetables, and my carbohydrate intake had come down, and I think that that may have contributed to sort of the positive impact that sort of accentuated the high levels of NAD that I had. And when that happened to me in over the course of, let's say, a year, I had lost about 40 pounds in fat 'cause I did a body comp. And then it was a lot, I think it was actually a year and a half, and then at that point, I met up with you at the Spartan race in Las Vegas and it was my first Spartan, and I ended up placing at the top one and a half percent.

Ben: Prior to that race, you actually took some NAD. I remember we were in the condo, and you were taking something, but you didn't do an IV, right? You just basically were using like one of these nicotinamide type of supplements we were talking about?

Thomas: No, actually I did IV NAD a few days before I arrived, and I wanted to see what kind of impact that had. I don't, I'm not sure, I mean this is just anecdotal, I definitely, I mean it's obvious, I already said that, yeah, I mean, I had no energy before, and now I'm doing all these things. But as far as me personally, having this immediate effect, I don't know where but that's something that needs to be looked at a little bit more.

Ben: Okay. Gotcha. Now, I wanna get into anti-aging here real quick. Dr. Grant, I know that you mentioned that NAD levels will drop when we age, which is perhaps why NAD is being proposed as an anti-aging supplement, but how much? Like is this a significant drop? Has this been studied in terms of the actual decrease?

Ross: Yeah, absolutely. I mean, we did some early studies back in 2011, we were just looking at animals, and across the age range you can see, while you know, accumulation of damage within the body, and things like PARPs go up the enzyme that's actually trying to repair the DNA go up, NAD

drops. And then we said, "Alright, what we saw in animals, we thought we'd better have look at that in humans". So we looked at it in, with the pelvic, non-sun exposed skin, all the way from, sort of eight day old circumcisions up to 79 year old hip replacement, and you could see again the damage sort of accumulating with time, and particularly after the age of 60. But then you could see the NAD drop fairly consistently with inflammation and oxidative damage, and in 2014 we published some work showing the same sort of decline within the brain, and this can be anywhere up to 40%. So there is a significant drop that can happen...

Ben: Forty percent is how much it could decrease as you age.

Ross: Yeah.

Ben: Is that just due to everything from oxidation to DNA damage, to living in an industrialized area where you've got lots of inflammation, free radicals, and things like that?

Ross: Yeah, it's predominantly what causes that inflammation and oxidative damage. So as we were saying lock-in formation of cell will drive oxidative damage inflammation which then damage the DNA, so you've got an increase in [0:59:51] _____ that drive the CD38. Now, CD38 is definitely involved in the immune function as Dr. Milgram is saying earlier, but CD38 probably has some other function. We have some other what we called NAD like a hydrolases that function in ways that were not really quite sure in a cell but these seem to go up to certain CD38 when we have inflammation going on and that seems to be also a primary driver of decreasing NAD as we get older.

So, there is a significant drop in NAD and it depends where you'll look for I mean, whether or not it's enough in the plasma or whether it's in the tissue itself. So it can vary depending on the different tissues, but certainly in the plasma they can give quite some significant shift. And also in the fluid that drains the brain called the cerebral spinal fluid which is a good indicator of what actually happening clinically within the tissues.

Ben: Okay.

Philip: I remember reading some studies that they tested people under 45 and over 45 for their NAD levels and they found that 300% increase in the average between the pre- 45 and post-45. Also, another study shows that it seems to exponentially increase after age 60 the loss of NAD.

Ross: The loss of NAD that's certainly what we found after the age of 60. So, there seems to be an acceleration of damage and therefore an acceleration of the rapid loss of NAD as a result.

Ben: Can you actually test your own NAD levels, like is there a blood test for that?

Ross: Yeah look, we have actually offered that to one or two of our clinics here in Australia or any because we know that they can actually get sample to us in a particular way which preserve NAD. The trouble with doing it and sending it through a normal pathology lab is a) they won't do the test, and b) the samples itself once it collected needs to be preserved extremely quickly otherwise NAD will change

very rapidly, and so you'll get abnormal results. So it is possible to do it but it's a bit tricky to do it sort of in a regular basis in a normal lab at this stage.

Philip: We are gonna be dealing clinical trials in our facility and in conjunction with Dr. Mathai in Louisiana to do this the right way, and actually test people with the special testing that Dr. Grant is talking about. We had to purchase this special centrifuge and we have to handle the samples in a certain way, and we are gonna be deforming clinical studies on this.

Ben: Well, vitamin B3 is also known as nicotinic acid or niacin or nicotinamide, couldn't you just measure your vitamin B3 levels?

Ross: Vitamin B3 is an important precursor to NAD and as we mentioned nicotinamide, if you take nicotinic acid, yes you'll be able to generate NAD through that pathway. If you take nicotinamide, nicotinamide is that sort of complicated situation where it's both can be made back into NAD but it's actually a byproduct of NAD. So nicotinamide is going up doesn't necessarily mean that NAD is going up. Nicotinamide going up could actually mean that you're turning over NAD quite a lot. So, difficulty there.

Ben: Okay, gotcha. And I've got a few other questions: the first is I know that a lot of people listening in and Thomas kinda briefly mentioned that he thought that some of his symptoms may have been indicative of something like Lyme disease, and I've heard a few snippets here and they're about the use of NAD for the use of something like Lyme which I know is a frustrating issue for a lot of people who have chronic fatigue is this Lyme infection. What's the link between NAD and the treatment of Lyme disease?

Ross: Well, I'm not sure if Dr. Milgram wants to make comment there. I can sort of begin that one off. Lyme disease is originally as a *Borrelia* infection which is a spirochetal bacteria. And people think to end up with chronic fatigue, reduced energy, and there are some central nervous system dysfunction that can happen with people at a chronic stage, and one of the things that NAD will do as we've talked about in essentially from the beginning of our discussion is that it has a significant improvement in being able to increase the efficiency of energy production. So it's probably working on at that level, I don't know of anybody who's done any specific studies to look at mechanism and I guess that's where we probably still lacking a bit of information but improving energy production, improving the way the immune system probably functions which is the primary driver often behind and this is sub-clinical so it's hard to test a little bit. It seems almost certain that you've got dysregulated immune function. Again, maybe through CD38, some of these [1:04:50] _____ maybe out of half ways but we probably able to modulate more efficiently the immune function as well as increasing mitochondrial function.

Ben: Okay, got you.

Philip: It's a controversial subject, Ben, about treating Lyme disease, and I know doctors, well intentioned, wonderful doctors that have lost their medical license by treating Lyme disease. But I can say that for sure the NAD in many cases can help decrease some of the symptoms of Lyme

disease. We're not treating the cause of Lyme disease which is antibiotics treating a bacteria but some of the symptoms can be lessened with NAD.

Ben: Now Dr. Milgram and Dr. Grant, as we're coming up towards the end here, is there anything else that you want to throw in as far as things that you find exciting in the realm of NAD research or the use of NAD as an anti-aging drug or for the use in other conditions?

Philip: Well, even the MTHFR gene has improved with NAD. The...

Ben: When you say the MTHFR gene has improved with NAD, what do you mean?

Philip: Well, again, this unspooling of the DNA, it may make the expression of the MTHFR gene change through a snip called C677T.

Ben: And for people who are listening, can you explain this MTHFR gene?

Philip: I'd rather like to talk about, more about some other things that I'm really excited about NAD.

Ben: Okay.

Philip: I have been doing addiction treatment for 25 years, and I've treated hundreds of patients, the good old-fashioned way of white knuckling it, and seeing them go through terrible withdrawal symptoms, through cravings, and the NAD virtually stops that. It's just absolutely amazing. They have like a brain, people say they feel like they've never used before, or drunk. Their cravings are decreased. It's just amazing, and I'm really excited about, not only the anti-aging things that they've talked about, and there's people like Dr. Watson, and if you have a chance to hear Dr. Watson talk from UCLA, he is extremely excited about the effects of NAD for an anti-aging. And also, these different disease processes that we've before had no way to treat them. Things like fibromyalgia, or chronic fatigue syndrome, Alzheimer's disease, Parkinson's disease, ALS. They're finding that NAD can make a difference in the therapy of these patients. I think, in my opinion, and this is just an opinion, NAD will turn out to be one of the greatest advances in medical science since Fleming invented penicillin.

Ben: Wow. That's quite the claim. And in terms of people using NAD, you're thinking that it's gonna be just like these type of injections that you're doing, that are gonna get the most efficacy? Or are you just talking about NAD in general use as a supplement?

Philip: I think you need to flood the body with NAD to start off with, and then we're looking that this place that found out where, what is actually was in Dr. Hitt's amino acid therapy from Mexico, it was pure NAD. They are manufacturing a pure source of NAD that we are now using as supplementation. And then you can also use the nicotinamide riboside, and other dietary things to enhance this. And also it's important that you do all of the things that, you're expert in Ben, with the fasting, the mechanical stretch, the exercise, the low glucose, proper circadian rhythms, and sleep, all these things will enhance the effectiveness of your own NAD to work.

Ben: Yeah, and I think that's the key here whenever we talk about like a new anti-aging drug, or we talk about like this Scientific American article is they'll talk about the use of things like resveratrol, or NAD, or nicotinamide, or many of these other compounds, and they'll say that in terms of like mice and mitochondria, that the effects of NAD simulate the effect of calorie restriction, for example. And the way I like to think about things is that you first do the lifestyle strategies, right. Like consume more dark berries, blueberries, or grapes, or resveratrol containing compounds, engage in calorie restriction, expose your body to good amounts of oxygen, pay attention to things like air, and light, and water, and electricity, and all those other things that can affect mitochondrial variables.

I'm not saying you cover up a bad lifestyle with something like NAD injections, or the use of some of these NAD supplements that we've talked about, but it sounds like, especially as you age, and especially based off of what Dr. Grant said as you get past 60, if you want to engage in some type of anti-aging protocol, it sounds like this might be a smart one to throw into the mix based on actual research that's been done on what this can do to everything from DNA to cellular damage.

Thomas: Correct.

Ross: Yeah. Absolutely.

Philip: And also, when Dr. Grant is the world's expert on oxidative stress and NAD, and he brought up a point as we were talking about preparing for this conference. He talked about, you know, if you have a lot of rust around, you have a lot of oxidation going around, the NAD's not gonna be as effective. So you have to have a healthy lifestyle which will enhance your NAD expression.

Ben: Yeah. Yeah. Exactly. As with a lot of these things we talked about here, you can't cover up a bad lifestyle with a pill. Well guys, first of all, Dr. Grant, I wanna thank you so much for coming on the show, as I know it's extremely early over in Australia.

Ross: You're most welcome.

Ben: And Dr. Milgram also. Thank you for coming on and devoting your time. And Thomas, thank you for your introduction to Dr. Milgram and Dr. Grant, and for kinda opening my eyes to NAD.

I have a couple more quick questions. As far as any further resources Thomas, for folks, you had mentioned to me a book written by a guy named Dr. Nady Braidy, called "[NAD+ Metabolism In Neurodegeneration and Ageing,](#)" which I know is available on Amazon. Is that what you would consider to be the best resource for people to delve more into NAD, or are there other places you would point people to?

Thomas: I think that's a great resource. It's heavy reading. That was written by Dr. Grant's student, and now colleague of Dr. Grant, and I think that would that's a great place to start if you wanna go heavy into the science. Dr. Milgram also has a blog at his website, nadtreatmentcenter.com, and the blog gets updated with new science as it unfolds.

Ben: Okay.

Thomas: So that's nadtreatmentcenter.com.

Ben: Cool. I'll link to that, and I'll also link to everything else that we talked about including this Scientific American article, some of the resveratrol supplements that we discussed, the book by Nady Brady, et cetera if you just go to bengreenfieldfitness.com/nad. And if you go to bengreenfieldfitness.com/nad, that is also where you can leave any questions, any comments, any feedback that you have about today's episode, or anything else that you wanna pipe in on in terms of your own personal experience with NAD, or other anti-aging protocols that we discussed in today's show. So gentlemen, thank you all for joining on the show today.

Philip: Thank you.

Ross: You're welcome.

Thomas: My privilege.

Ben: Alright, folks. So, this Ben Greenfield, along with Dr. Grant, Dr. Milgram, and Thomas Ingoglia signing out from bengreenfieldfitness.com. Once again, you could check out the show notes at bengreenfieldfitness.com/nad. Thanks for listening and have a healthy week.

You've been listening to the Ben Greenfield fitness podcast. Go to bengreenfieldfitness.com for even more cutting-edge fitness and performance advice.

Scientific American recently published the article "[Beyond Resveratrol: The Anti-Aging NAD Fad](#)", an article that proposes that...

... "recent research suggests it may be possible to reverse mitochondrial decay with dietary supplements that increase cellular levels of a molecule called NAD (nicotinamide adenine dinucleotide)"...

...and also that...

... "the mitochondria in muscles of elderly mice were restored to a youthful state after just a week of injections with NMN (nicotinamide mononucleotide), a molecule that naturally occurs in cells and, like NR, boosts levels of NAD"...

Since that article was published I've received an onslaught of questions about this mysterious molecule called NAD.

It just so happens that a friend of mine, Thomas Ingoglia, known as one of the best NAD scientists on the planet and is also in contact with the best NAD clinicians on the planet – both with decades of experience second to none. I consider Thomas himself to be one of the most knowledgeable and frequent users of NAD I've ever met, and one of the few that has been playing around with NAD in combination with cryotherapy, blueberry extract, hyperbaric oxygen and other "biohacks" to completely

turn him around from being bed-ridden sick and losing half his family in a car crash to being in the best health of his life, including crushing his first Spartan race with me last year (prior to which took high doses of NAD).

Problem is, most NAD clinical researchers are all underground at the moment. The FDA doesn't look kindly at NAD supplement companies and integrative doctors, they are quite skeptical of naturopathy, and their first impulse is to turn these things and others into patentable drugs because that's the language the FDA speaks. Plus, NAD can be dangerous. Thomas even knows a guy personally (ironically, a Phd in toxicology that poisoned himself due to his own error) who hospitalized himself experimenting with the substances we're going to be talking about in this podcast episode. So you need to proceed with caution and with the formal clinical information Thomas has opened my eyes to.

Along with Thomas, today's podcast features Dr. Ross Grant, Phd. Dr. Grant is perhaps the most prolific authors in the field of NAD, and he specializes on NAD in the brain. He started researching NAD research back in 1994 while being laughed at, when no one was doing NAD research.

Dr. Ross Grant is Clinical Associate Professor at the University of Sydney Medical School and CEO of the Australasian Research Institute, Sydney Adventist Hospital. A biochemical pharmacologist with a Ph.D. in Neurochemistry/Neuropharmacology, Dr. Grant's research is focused on NAD – specifically the role of oxidative stress – e.g. emotional stress, diet, and exercise – and NAD metabolism on brain cell death and cellular degeneration. A secondary interest is in the effect of exposure to novel nutritional components, such as polyphenols, on human cellular response to oxidative stress, with a goal of detecting and correcting early degenerative biochemical changes associated with aging-related degenerative disease.

Dr. Grant is a member of the Australian Society for Medical Research (ASMR), Australian Neuroscience society (ANS), Australian Society of Clinical & Experimental Pharmacology and Toxicology, Nutrition Society of Australia (NSA). With forty-eight articles published in peer-reviewed scientific journals, Dr. Grant is perhaps the most prolific author in the field of NAD research.

In addition to Dr. Grant, we are joined by Dr. Philip Milgram, MD, from the [NAD Treatment Center in San Diego, California](#). Dr. Milgram recovered from his own challenges with addiction and now helps other people in recovery from addiction, specifically by using NAD protocols. He trained in 1991 with Vernon Johnson, the man who coined the term "Intervention". He was certified as a Prevention Specialist by the Certifying Board of Alcohol and Drug Counselors (CCBADC) in 2001, and has three degrees in counseling from UCSD; in Counseling and Interpersonal Communication, Alcohol and Drug Counselor and Advanced Intervention.

In addition to NAD Treatment Center, Dr. Milgram served as the original Medical Director of Confidential Recovery and the Pamarro Detox Center. He has also served as the Medical Consultant for The Soledad House Recovery Home for Women and ABC Recovery since they opened. He is a member of the attending staff at Scripps Memorial Hospital in La Jolla and Board Certified in Obstetrics and Gynecology. Dr. Milgram is a member of The American Society of Addiction Medicine, the California Association of Addiction Medicine, International Doctors in AA, Like-Minded Docs Addiction Medicine, The American

College of Preventive Medicine, the American Society of Anti-Aging Medicine, and the American Nutraceutical Association.

During our discussion, you'll discover:

- An easy explanation of what exactly NAD is and what it does inside your body...
- The protocol Thomas used to go from being addicted to opiates and chronically fatigued to completely healed...
- How NAD can break addictions to alcohol, food, opiates and more...
- The relationship between anti-aging and NAD...
- The important difference between Nicotinamide Riboside vs. Nicotinamide (NMN) vs. NAD+...
- The best way to "flood your body" with NAD, and why grapes and blueberries are so important when it comes to your NAD levels...
- What kind of compounds, foods and lifestyle strategies enhance the effect of NAD...
- How NAD can increase your time to exhaustion during exercise by over 15%...
- How Thomas used NAD to enhance his performance in a Spartan race...
- The best way to test your own NAD levels...
- How NAD can be used in the treatment of Lyme Disease...
- The best resource for people to delve more into NAD research...
- And much more!

Resources from this episode:

- [Book by Nady Braidy: NAD+ metabolism in neurodegeneration and ageing](#)
- [NAD Treatment Center in San Diego, California](#)
- [Nicotinamide supplements](#) (be careful with dosage on this, as we discuss in podcast!)
- [Nicotinamide Riboside supplements](#) (dosage also discussed in podcast)
- [Resveratrol supplements](#)
- [Wild blueberry concentrate supplements](#)
- [Thorne Resveracel](#) (resveratrol + NAD)

[–Pau D' Arco Bark tea that can be brewed and blended with fats such as coconut oil or krill oil to create NAD-based phospholipids](#)

Disclaimer:

NAD⁺ infusions are an experimental treatment, and do not have FDA approval and haven't been fully evaluated. To the best of our knowledge there are no lasting problems. This IV therapy has been around for decades but it has mostly been underground. Over ten thousand patients have had NAD⁺ intravenous treatment but this is not a panacea and not everyone is going to have positive results.