How To Reverse Inflammaging Through Ketosis Transcript

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Introduction to Chronic Inflammation and Ketosis

Welcome to the conquering Chronic Inflammation Summit. I'm your host, Dr. David Jockers. And today our topic is how to reverse in inflammation. This impact of inflammation on our aging process through physiological nutritional ketosis.

And so we're going to do a deep dive on ketosis and how to really get your body into this unique and amazing physiological state. My guest is Dr. Ryan Lowery.

He is a PhD 2014 national champion baseball player. And he also he serves as the CEO of Pro2col Health and co-founder of ketogenic.com He has published over 150 papers, abstracts and book chapters on human performance and sports nutrition, and is heavily focused on the impact of ketogenic diets and exogenous ketones on performance, cognitive function and longevity.

And we're going to go through that in detail today on reversing inflammation aging.

Ryan Loweryu2019s Background and Crohnu2019s Disease Study

Ryan also coauthored the book The Ketogenic Bible and his his his work really focuses on the science and practical application behind the ketogenic diet, exogenous ketones, and all their potential applications.

So you can find him ketogenic.com. And so, without further ado, let's go into the interview. Well Dr. Ryan Lowery, great to connect here. I really, really appreciate all the great research that you're putting out and all the great work you're doing helping people understand this amazing physiological state of ketosis and how we can use that therapeutically to bring down inflammation to improve health and healing.

And, you know, you've done a lot of research with that. And I think it started really with your, your, your dissertation when you were studying Crohn's disease with your mom.

Can you go into more detail on that? Yeah. First off, thank you for having me on Dr. Jockers I'm honored to be here. super, super excited and passionate about this topic.

it actually started when I was a bit younger. My grandmother passed away at a very, very young age of 61 years old, heart disease, type two diabetes, and that kind of led me to be like, you know what?

Something's not right here. Like, people always are talking a lot about exercise. And I think exercise is super important. and it's it has its place. But for most people, nutrition is often overlooked and they don't really understand how to, how that impacts their overall health and function.

And so that led me down this route to go, you know, I want to dedicate my career to studying nutrition. So I got my master's in exercise nutrition science, PhD in health and Human performance.

And while I was getting my PhD, just starting it, my mom had this huge flare up with her Crohn's disease. and so that I was like, you know what? I was trying to pick a dissertation topic.

And I said, mom, I love you. You're going to be my guinea pig. and so I literally moved her down from new Jersey to Tampa, and she became like this core subject for my dissertation.

And we looked at, cause she had super, super, super high levels of inflammation. When you have some of these irritable bowel syndrome, you know, it's very, very, very high inflammation.

She struggled with this her entire life growing up. It was tough because we'd go to different places or go on vacations. And it was always like, hey, we got to be within 10 to 15 minutes of a bathroom because mom could never knew what was going to happen.

And so it was it was tough seeing her struggle with it. And so it was an honor for me to be able to dedicate my dissertation to her and really be able to study her.

And the results we had were incredible. Well, how did you set up that study? Yeah. So we we had a lab at University of Tampa, formerly I was at University of Tampa.

We we taught there for a little bit. I did my master's and undergrad work. and then now we have our own facility, called Aspi, where we do a lot of this research. And so I said, you know what?

Let me let me set this study up and say, what what do we want to measure here? So at first I was like, do we do a ketogenic diet? At the time when we first started studying a ketogenic diet, it was very new.

It was being used by Navy Seal divers, like for oxygen toxicity. Seizures with Dr. Tommy Agostino. Like that was really the only work being done, what, 15 years ago?

and so I was like, I don't know, what do we, what do we do? So I was like, you know, maybe we do a lower carbohydrate approach, maybe try and cut out some of the things that might drive her inflammation because some of the things she can't eat that normal people would typically.

and on top of that, we incorporate in steps. And we used exogenous ketones, which were very new at the time. Like it was like, what are the what are these substances now?

There's a lot more data that we can talk about. But this was. Like thousand 13, 2014 somewhere in that time frame. Exactly, exactly. So at the time, all the, all these kind of interventions were still very, very, very new.

and now obviously they're a lot more mainstream. But, so that's what we utilize. We utilize exogenous ketones twice a day, a lower carbohydrate diet. And we made our walk about 7500 steps per day.

that was that was the intervention, right? Yeah. Yeah. And so 7500 steps, what would that be equivalent to as far as like miles, do you know. You're probably talking about two and a half, maybe three miles a day.

so we do a walk and we did a walk in the morning. Walk at night, and maybe just like a walk during lunch, it's it's it's fairly easy to hit outside here and here in Florida.

But the, the most interesting part of this study, was I wanted to look at we looked at body composition. Right. We have a Dexa machine where we can look at a little bit more under the hood.

Ketogenic Diet Basics and Individualization

I like to say, of body composition, a lot of people use a scale sometimes they use tape measurements. We have a Dexa machine where basically does this full body scan.

It can look at visceral adipose tissue, body fat percentage, bone mineral density, everything. so her body fat significantly decreased over this 90 day period.

We looked over 90 days. She was able to maintain her her muscle mass. So just lost a ton of weight, almost all body fat. But the most interesting part was her CRP levels.

And you know, CRP is a marker of inflammation. The average range that you'll see on, like a typical blood panel is like from 0 to 4.9. She was at 63. to put this in perspective, which.

Is not uncommon with people with inflammatory bowel disease. Right, exactly. Skyrocketing. So which you. Would think like if she went in and to a doctor and didn't complain of any gut issues and had that they think she was having a heart attack or something for.

Sure. Exactly. Right. And she would constantly get that she was afraid to go to doctors because they would kind of be like, oh, let's put you on this, this, this, this because they were super afraid of like, this is ridiculously high.

within 90 days of being on that protocol, we brought her CRP levels down to 4.1, or 62.5 to 4 point 1 in 3 days is like unheard of. Right. so that's been a protocol.

She's kind of been on since, and is thriving, doing great. so it's amazing just to see that I, that that type of intervention can make such a big impact. Right.

Yeah. Huge impact, that's for sure. And so that was again, ketogenic diet was very new at that time. but you know, there's been more and more research being done.

And obviously you're one of the leaders in that. And so what have you learned over the last ten years as far as best strategies for helping to formulate a good ketogenic diet?

Yeah, I think we've seen so many different, ebbs and flows of keto right now. You're seeing like like carnivore keto versus vegetarian keto. And like I think we saw this huge surge of, like, keto snacks that came to the market.

And everywhere you looked at it with all these different snacks, some were might have been actually ketogenic. A lot of them weren't. So we've seen a lot of things.

Some come and stay, some come and go. One of the things we've seen in our lab, that we're working with a lot of different, people now, we're working with people from Alzheimer's, Parkinson's, traumatic brain injury to athletes.

and a lot of times when I first started studying the ketogenic diet, I always thought like, it needs to be 75 to 80% fat. Like, that is what I was like.

It was like, if you go underneath that, you're going to instantly be knocked out of ketosis. And what I'm starting to see now is it's very, very individualized.

There are some people we work with that are at 55, 60% fat and still maintain steady levels of ketones. And so it really depends on one. Your goal, and two, your bio individuality.

Right. Like how your body tolerates carbohydrates, how good you are at kind of processing fats. And ultimately generating ketones and utilizing ketones.

And I think that's probably my second piece that is the most interesting is I think back in the day, we used to chase ketones. It was like, cool, let's compete.

We got this, we got this number, and everyone would be like, I got higher ketones than you. And it's like, does that make me better? maybe it actually might make you worse.

and so a little sub topic that I did of my dissertation, which was really interesting, was we all heard of the oral glucose tolerance test. Right. I was I was kind of like, well, why don't we have an oral ketone tolerance test?

Like, why hasn't anyone thought of this? Could we use oral glucose tolerance test, though? There are many flaws to it. But to determine some degree of insulin sensitivity.

Right. and that oral glucose tolerance test, basically you're, you're you're, you're drinking like, almost like pure sugar and just kind of seeing where your blood sugar goes to, right, how high it goes.

And then kind of the, the time frame it takes to get back into balance. Exactly. Right. Exact. So a time course of like great, I drink this. Usually it's 75g of this huge bolus of just disgusting amount of sugar.

And then you see how quickly it comes back down. And because your, your body has to release insulin to try and bring it back down. So, I was like, why don't why are we doing this with ketones?

So I did this kind of like little subgroup, which was really interesting of people who were on a ketogenic diet and some that were not on a ketogenic diet.

And what I do is I gave them ten grams of exogenous ketones and looked over a time course. And the difference is you saw were extraordinary. Some people went up and came back down very quickly, and those tended to be the people who were on a ketogenic diet and exercising the longest.

And then you take some people who are not exercise ING, eating a highly processed, highly carbohydrate based diet. And like sometimes I would give them exaggerated ketones and they would stay elevated in their blood for five six hours.

And it's like, well, is that necessarily a good thing? Back in the day you would be like, oh, I got higher ketone levels in you. Whereas I look at that now and I go, well, maybe that person who was on a ketogenic diet and exercising is a better ketone user than the person who has the elevated ketones.

So or what is our goal? Is our goal to have higher levels in the blood, or is our goal to be a better ketone? Utilizer. And I think that's probably the better goal.

Yeah, that makes a lot of sense. I talk a lot about metabolic flexibility. You want to be good at burning glucose during times where you need to be burning ketones, like when you're exercising.

You also want to be very good at burning fat and ketones, right? Because that's what we need for the brain. You know, at times when we're not exercising, we're not doing things at a high intensity when we're sleeping, for example.

and so we want to be really good at going back and forth between both of those fuel sources. And like you were saying, that sort of test, which makes a lot of sense, testing the, you know, taking exogenous ketones and then testing ketone levels, you might get a, a nice rise in the ketones.

And if it stays there for a while, you would seem like, well, hey, these ketones are working, but you're not actually getting them into the cells where they're needed or where they can use for energy be used for energy.

So you're inefficient. They're exactly right. Exactly. Yeah. For sure. And so when you were doing this study now obviously, you know, the idea of ketosis nutritional physiological ketosis was new.

So what your hypothesis was obviously that it would bring down inflammation in your mom. And what were the mechanisms that we had at that point? And what sort of mechanisms have we found in the research for how ketones do bring down inflammation in the body?

Ketone Tolerance, Metabolic Flexibility, and Inflammation

Yeah, absolutely. It's it's a great question. One of the things that has come to light since is I knew that there were some data on a ketogenic, a well formulated ketogenic diet bringing down some of these markers of inflammation.

The primary driver of that, I believe, is this LRP three inflammasome interaction. Right. And the way I like to explain it is like, imagine there's a light switch on your wall, right?

and sometimes that light switches on, sometimes that light switches off for people with chronic inflammation. That light switch is always on. It's always kind of this this Nlrp3 inflammasome on.

So what ketones do is they kind of act like a bodyguard that stand by that light switch. And when a lot of these free radicals and oxidative stress come to turn that light switch on it like blocks, and so it blocks this Nlrp3 inflammasome from kind of triggering or turning on.

and so I think that's one of the main drivers is ketones. not only are a fuel source, they also have this signaling element. And one of them is this involvement in this Nlrp3 inflammasome cascade, which is really, really fascinating, and kind of how it relates to insulin resistance and chronically high levels of blood glucose.

Yeah. And LRP three inflammation is basically like an amplifier of inflammation. So rather than just, you know, a very small amount of, let's say inflammation in the body, it amplifies it like you were talking about turning the light on.

And that can spread throughout the entire body. Yep. Exactly right. Exactly right. And then on top of that, by eating a low carbohydrate diet, walking right, she's she's decreasing her her blood glucose levels.

She's improving insulin sensitivity, probably reducing a lot of these advanced glycation end products, that are chronically elevated in people who have severe insulin resistance.

so a lot of mechanisms probably at play here. but overall, just being in this state of ketosis over and over and over again, we see from our research, but also other published research just shows that it has a fantastic effect on lowering, some of these inflammatory markers.

Yeah. And what's interesting is at the time when you were doing this study, most of the research was done for for ketosis on epilepsy and reducing that Nlrp3 neuroinflammation.

So the inflammation in the brain, which when that gets amplified, that can lead to things like epilepsy, can also cause neurodegenerative states, things like that.

There's a lot of research on that with your mom though. Her inflammation was in her gut. And so there really hadn't been that. I was aware of research on chronic inflammation in the gut pertaining to ketosis.

Yeah, it's a great point. and that's another thing right now that's the gut microbiome research is is fascinating. And I think I think it's important for us to understand the limitations that we have when it comes to gut microbiome research.

Like we yeah, we can identify and we can look at we can do the stool testing and look at the gut microbiome. But like and a lot of times some of the research you're seeing come out go, oh well a ketogenic diet is bad for the gut microbiome because it decreases this one strain.

And my counter to that is, maybe, but probably not, because you need to look at it as being in a state of ketosis, something that's never been it hasn't been studied in this regard yet.

Like it completely changes the dynamic when you're in a state of ketosis. So a person who's eating a high carbohydrate diet, you may map out and go, hey, this is what a healthy gut microbiome looks like.

But I don't think we've done that. For someone who's been in a state of chronic ketosis or eating a lower carbohydrate diet that game, or even on a carnivore diet, which obviously a lot of super popular now like that, that whole dynamic changes.

So we need to be careful of just saying, oh, there's one strain goes down, therefore it's bad. I don't think we could say that. Yeah. And I think a lot of papers are trying to indicate that.

But there's still a lot of, a lot of work to do in the gut microbiome space for sure. I've seen a really the only thing that my gut microbiome researchers agree on.

Well, two things. One is that the gut microbiome is really important. Yeah. And number two, that diversity. It seems like diversity or the overall number of species.

That. Are available in the gut seems to be a really important overall factor. But as far as the amounts of various species really don't have any sort of, you know, conclusive evidence on that.

Agreed, agreed. And one of the things I kind of have this theory that you look at, one of the most potent, things that drive beneficial gut bacteria is something called butyrate.

and if you've never tried to, like, consume butyrate, it's very rancid, kind of tasting and smells and tough. It's tough. It's a short chain fatty acid for carbon chain fatty and short chain fatty acid.

Yep. Exactly. And so but think about BHB, which is the main ketone body that gets produced when you're on a ketogenic diet or even with some of these exaggerated ketones.

It's beta hydroxybutyrate. So you would imagine it's getting cleaved at some point. You're getting some element of butyrate that's likely getting to the gut.

Is that having an impact? Maybe. Maybe that's part of what's driving this improvement in the gut microbiome. Maybe not. but still a lot of work to be done.

Yeah. For sure. And, and the way that you formulate your ketogenic style diet can also make a major impact, like you were talking about. I mean, there's if you go into a grocery store now because keto so popular, you'll find like keto cookies.

And, you know, one of the main ingredients is, is wheat gluten, right?

Gut Health, Food Quality, and Protein Prioritization

Like they take the protein gluten component, which many people have sensitivities to that drive up gut inflammation and intestinal permeability. That's like the main ingredient in some of these products.

And so you can get a very high ultra processed ketogenic style diet that has the macronutrients, but it's high in processed foods and high in lots of things that we know are inflammatory seed oils.

or you can do one with real whole foods. And there's a difference there. We just haven't really you know, it's hard to kind of put together the research on that.

to figure out what the difference is. It's a great point. And I think it's funny because when I first started the ketogenic diet, like when we played around with it before we did our first study, I think back in like 2011, 2012, looking at a ketogenic diet and on body composition, I was like, well, let me try this thing.

I've always eaten cod my whole life. Let me try this ketogenic diet. And for every meal, which I do not recommend for anyone listening to this, but I was, I basically made I was like, oh, I'm just going to make it all sweets.

So I would make I would put heavy cream in a bowl. I put a little bit of cocoa powder, some sweetener and protein. I was like, all right, I got my fats and protein, would mix it up, put it in the fridge.

And it was like this, like chocolate mousse. Well, I didn't I wasn't tracking calories, I wasn't doing I'll probably 5000 calories a day. I'm like, after four days, I'm like, I'm not feeling great on this ketogenic diet.

But that shows like cool I was I in ketosis? Yeah, my ketones were high, but was it a well formulated drink diet? Absolutely not. Yeah, absolutely. And so what would you say at this point from what you found and how you follow a ketogenic diet?

How would you recommend other people to do it? Yeah, I think. There is this concept of bio individuality, like some people can thrive on a carnivore diet and that's fine.

And some, some people like me, I just never that was never my route. I like vegetables and I like meat. so like, I like incorporating in both of us. I think for most people who are on occasion like that, some form of intermittent fasting, periodic intermittent fasting can be extremely beneficial.

It and being in ketosis actually makes it easier to be on to intermittent fast. Then if you're having a ton of carbohydrates all the time. But for me, the thing I tell people just to focus on is like one prioritize protein.

I think we often overlook that early on is like, make sure you're getting in a quality amount of protein, and at least I recommend like 25 to 30g per meal, like at the very minimum of that high quality protein.

Eat that first, have your fibrous fruits and vegetables with it as like a side, and then fill in the rest with that. Whereas like that's kind of one of the things that's changes.

I always used to start with fat. I was like, oh, I need to start with this now. It's I'm prioritizing protein, I'm eating my veggies. And then I'll put some butter on my steak.

Right. something like that is just like, that's kind of my approach for most people now. I just keep it simple. Right? Yeah. Right now I'm right with you.

You know, I actually discovered we didn't call it the ketogenic diet called the Healing Diet back in 2004. I actually had irritable bowel syndrome and had it pretty bad.

And I, Doctor Mercola had just come out with a book, and it was the no grain diet. So I took grains out. Right. And so I was eating fruit, vegetables, meats and fats. Right.

And I and I was able to heal and I, and I felt a lot better. And I read a book that say heal fats That kill. And so I started really focusing on fats and utilizing fats.

And then later on, you know, I started doing intermittent fasting before I was even talked about. And then later on, I discovered the idea of a ketogenic diet.

Right. Right around that time when you were doing the research, I started putting out a lot of content on, on that. and yeah, I used to focus on fats first.

Right. But what I found is I personally was actually focusing on protein when I would make the meal. I mean, okay, so I would think for myself protein.

But then when I would teach, I would teach fat first. And so, probably about 6 or 7 years ago, I flipped that in the way that I teach. And I'm very big on emphasizing that protein.

I really think it provides satiety. I also found that there's a lot of different individuals, like for me, I can eat a lot of fat in a meal and feel fine, but there are a lot of individuals that because they have sluggish bile flow, right?

They just can't handle that much fat. Maybe they don't even have a gallbladder. So but they can if we focus on the protein and then we kind of figure out the fat from their their tolerance point with the fat in a meal, I find that, people are so much they feel better doing it, as opposed to when we loaded them up with fat in the beginning, and then they were like, oh, I feel terrible, right? I can't do this.

and there was always a percentage of people, particularly typically women, that would feel that way. And, wasn't until I flipped the protein, that I found that.

And then I also found when it comes to fiber in general, fruits, vegetables and fiber, it's kind of like a bell curve.

Right? So, yeah, you and I are probably more in the middle where we can handle a decent amount.

Right? If I do too much cruciferous vegetables, I get bloated, right? if I eat, like, just salad all day, I get bloated. But if I have some salad, right, or some cruciferous, I feel great.

and there are some people that seem to thrive on more of a plant based diet, and they they're on one side of the bell curve. And then there's some people that they seem to thrive on, a carnivore diet.

They're on the other side of the bell curve. So it's kind of figuring out where you are on that bell curve. The general population, probably 50% of the population, 60% are going to do good on basically, you know, a diet with lots of meat, lots of vegetables.

Right? Kind of a combination of, a balanced diet. I guess you could say fruits, vegetables, healthy meats, healthy fats. Right. But then you might be, you know, on one of those more outer layers of that, you know, the on the sides of that bell curve.

And you got to figure that out for yourself. 100%. I couldn't agree more. Yeah. And now you were an athlete when you came into this. You were a baseball player.

And so a lot of athletes are concerned because, you know, like you were you were saying athletes are told, hey, you got to get you got to get the carbs, right.

You need you need glycogen load. and so did you have those sorts of, ideas as well. And, how have you done this? As you know, when you were an athlete?

And then also, how do you approach this with athletes? Yeah. Great question. I think it depends on the sport. Right. Like there are some sports where it's an absolute no brainer, like super long duration triathlon.

You're seeing a lot more of these type of athletes adopt a ketogenic diet. Right. It's like, do I really want to be slugging down gurus and gels and all that stuff?

That's going to destroy my gut during the race? Or do I want to tap into my own fat storage? Right. And Doctor Jeff Bolick spearheaded a lot of that research, and it's done a great job kind of talking about these ultra endurance athletes and how they are thriving on a ketogenic diet.

now, what I was interested, I was a baseball player, so I was more of like a power sport. And so, so there's there's some where it's like, well, yeah, you might for maybe short term sprinting, maybe being full blown ketogenic not having carbs probably isn't ideal.

Right. You might want to maybe maybe do like cyclical ketogenic diet. In that case you want to probably have carbohydrates because they're going to burn through that very quickly during that sprint.

And they need that high amount to just get through it because it's a very fast kind of process. But where I'm interested is what happens in the middle.

What about sports kind of like that. Use a combination of the two and one of the studies we did with one of our colleagues, Doctor Jordan Roy, was in my athletes, I'm fascinated with like boxing, MMA, those because you need to be powerful and quick, but you also need a last round.

so it's tapping into all these different systems.

Ketogenic Strategies for Athletes

And so we did more of like a cyclical. We did a study doing a cyclical ketogenic diet with these individuals, basically meaning it was actually more targeted ketogenic.

So we were actually having carbohydrates around their workout bouts. Right. So they were staying in ketosis because they were burning through it because these workouts and sessions are intense.

But what we found is they were able to optimize their body composition because a lot of them need to make weight, right. So when they when they cut weight, a lot of times they're losing muscle and kind of slicing away at muscle.

Traditionally to try and make these weights. So that way they can compete. Well. If you take a ketogenic approach, you want to still maintain your power or still maintain your performance, yet cut weight, that could be a great tool and strategy.

And then on top of that, what I'm fascinated with, and some of the areas we're looking at is like the impact of ketones on the brain, right? I think it's silly for any MMA athlete, any football player, to not consider some type of ketogenic approach, whether that is a ketogenic diet, a targeted ketogenic diet, and or use utilizing some form of exotic ketones.

I think it's silly for them not to at least consider it, due to the overwhelming amount of data that ketones have this neuroprotective effect on the brain.

And when you're getting hit like that, you want to make sure you're protecting your right. Yeah, it makes a lot of sense. Now you bring up the exogenous ketones.

There's different types ketone salts, ketone esters. Right. These are made into drinks. Right. And they've got, you know, non-sugar flavoring like monk fruit or stevia or something like that.

People can drink. And, for years I always said keto esters or keto salts are easy to make into kind of a tasty drink. And many people, many of my listeners have had those keto stars are really hard to make into a tasty drink.

Can you go through the differences there and what you found utilizing those? Yeah, it's it's been an area I've been fascinated with. I actually had the pleasure and honor to meet Doctor Richard Veach back when he was still alive.

He was one of the originators of the ketone ester, incredible guy and really spearheaded a lot of the keto research that we have today back in the early 90s. But, exact when it comes to ketone esters, if you if you've never had it, it's the equivalent of like going to your great grandfather's gin cabinet and taking a shot, like that's what they taste like it.

It's brutal. It's like a gin that just you. It's good. It's brutal. So that's what most of them taste like. And it's like they've been trying for years to try and make these things palatable.

And it's just it's just not happening. And so now you kind of have three categories. You have ketone salts. You have like traditional ketone mono esters.

and then you have this one three butane diol which has kind of become a little bit more popular now. And obviously the ketone salts are the most palatable.

They taste they taste the best. Now I used to say, oh, when you're taking ketone esters, your ketone levels are going to get higher. Well, the only reason that we found and we've actually done some recent unpublished research on this, is because they used to be giving like 25ml of these ketone esters.

And you probably can't give 25g of ketone salts. That would be a very high mineral load. Right. so it's. Probably a diarrhea. easily. Yeah. and so it was like, well, yeah, of course you're giving 25 versus maybe ten grams.

Of course you're going to see. But when I ran for gram basis, we see that they elevate ketones the same. Now there's a study that we're about to, publish that some super interesting animal research is we looked at ATP levels in the liver.

And when you give ketone salts, you see ATP levels increase. When you get one three butane dial, you actually see ATP levels plummet in ATP like our energy.

So you are seeing a lot of these, which is kind of alarming. These professional athletes consuming one three butanol. They're taking these shots on their rides and things like that.

And it's actually taking away ATP. which may be counterintuitive to their goal. So maybe ketone salts would be a better alternative for them in that case because it's increasing ATP.

But, it's a fascinating area. And, why do you think that is? Why do you think that the one three. Say it again. One three. Butane dial. Yes. One three butane dial. Yeah.

I think in part is because there's an alcohol backbone, there's like an alcohol. So your liver has to process that. Right. So there's some degree of processing that needs to happen in order for that.

Once three obtain out in part to convert over to ketones, it needs to do a little bit more work. whereas ketone salts are kind of just beta hydroxybutyrate bound to an electrolyte, it just cleaves.

And now you have it available. So I think that may be the mechanism. Why. But we're still doing some work on that right now. Yeah. And for the listeners ATP is cellular energy.

So and you know you want to see if something really works. The most important thing our body our cells are producing is energy, in the form of ATP. And so if something's helping boost ATP production it's a beneficial effect.

If it's bringing it down, if it's reducing it, it's a negative effect. And then it's just a matter of kind of piercing out. Why the mechanism for for why that's happening.

And so very, very interesting as far as that goes.

Exogenous Ketones: Salts, Esters, and Performance

So you would recommend at this point in the research, ketone salts would be the best approach when somebody wants to elevate their ketones for athletic purposes or you know, and go into like the reasons why maybe somebody would want to use ketones, ketone salts because obviously you can get into ketosis, but there's a transition period for many people.

And then also with athletes, you know, based on their what they're doing for their athletic training, there may be periods where these having extra ketones in the bloodstream can be beneficial.

Absolutely. And I think the bigger Abbott and I think we're just starting to hit, we're just on the precipice of ketone salts taking off. I think because our application extends far beyond what most people originally thought they were, most people thought, I drink these exaggerated ketones.

Body fat's going to melt off of me. And, I don't need to go on a ketogenic diet. I could still eat a Big Mac and fry, and. And that's just not how they work, right?

It's just it is not. Not what exaggerated ketones do. But where I see a big impact is on the brain. Right. We're actively studying audience ketones for Parkinson's, Alzheimer's, traumatic brain injury.

And like a perfect example is like my grandfather is about to turn 90 years old, like he's this older Italian man. And as much as I love him to death as much as I tell him, grandpa, hey, maybe instead of having so much pasta, maybe try these alternatives.

He's he's going to eat the pasta, right? So for someone like him. But like, I want his brain to be optimized, right? He's starting to forget some things and things like that.

And so I'm like, well, that's a great application where his ketones can come into play. Hey, grandpa, when you wake up first thing in the morning, have some exotic whiskey. Right.

and he remembers a little bit more. He feels better. So what we're seeing with a lot of this Alzheimer's, Parkinson's, traumatic brain injury, a lot of these, deficits, really are the result of deficits of fuel in the brain, right?

We we know what type one diabetes is. We know what type two diabetes. Type three diabetes is really insulin resistance of the brain. There's inflammation in the brain and there's resistance.

Imagine you're taking you're trying to take up all this fuel. And you have a ton of carbohydrates and sugar available. But your brain and the receptors that take those up are blocked.

Well, what happens then was some of these neurons start to die and you start to see CTE in sports or you see some formation of things that you don't want in Alzheimer's, dementia and Parkinson's.

So what if there was a different fuel source that could bypass that, use a different transporter and still get into the brain? And that's what exaggerated ketones do, right?

And so I like to use the analogy of imagine all these tunnels going into New York City and like all these tunnels become blocked as you get older, year after year, this tunnel gets blocked.

All of a sudden there's you have a bunch of traffic that's trying to get into New York City. But eventually New York City would be a ghost town because no traffic can get in.

But then there's this one tunnel that this special car can get into, and no one's using it because they're not providing it. And that's what exaggerates.

Ketones are there, that special car, unique fuel source that can take that tunnel that isn't blocked, that can get taken up and utilize inside of the brain.

And so that's where I think the bigger application for exoplanets, ketones are. Yeah. It's interesting. That reminds me of a study I looked at a while back.

It was a 2008 study and all they did in this intervention was they went into a nursing home, you know, nursing home diets, terrible diet, terrible nutrition plan.

So they had all these people with cognitive decline. They just added MCT oil to their meals, and they saw subjective improvement in the in the individuals that they used it with compared to those who they didn't.

And so MCT oil also has a similar effect, although it doesn't boost ketones quite as high or as quickly as the exogenous ketones. But it's another tool right in our toolbelt that we can utilize here.

And, you know, cognitive decline is on the rise, but this is a really powerful tool to help with this. And then, like you were saying, all these different athletes that are getting brain trauma, right?

Head trauma, football players, boxers, even baseball players, you get hit with a fastball a hundred mile an hour, fastball in the in the head. Get on those exogenous ketones.

Right. Exactly. And it's a huge issue, right? The NFL is spending a ton of money trying to find better solutions or trying to build better helmets. You have the UFC that they're trying to figure out.

What do we do for these athletes, hockey players getting knocked up? And it's like, well, what if there was something that kind of provided this shield, at least in some regard, to help prevent a lot of that trauma?

And there's been plenty of animal studies where they've literally taken animals. and some of the animal studies are

a bit extreme, where like, they'll literally drop weights, to induce a concussion in some of these animals on their head.

And so they'll look at that and then they'll put the animal through a maze to see, like, cool after a concussion. Are they able to get through the maze?

And if they've had exogenous ketones prior to the concussion, they are able to get through the maze along faster than if they did. So would you recommend like if you had, let's say you had the Tampa Bay, you're in Tampa, so or you still live in Tampa, right?

So let's say the Buccaneers brought you out and they said, okay, well, how should we formulate our sports drink that, you know, all our athletes are drinking, which is probably Gatorade or something, some sort of, processed formula that they have.

How would you restructure that to help prevent these sorts, or at least not. You're not going to prevent them, but to minimize the damage from that, the head trauma that these athletes are experiencing.

Yeah, I believe that every, every university, every, professional sports team should have examined ketones on the sideline. we do work with some, actual, sports teams in Tampa.

that have went on to win championships. And they were utilizing exogenous ketones in their water bottles.

Ketones for Brain Health and Cognitive Decline

despite they might have a certain brand name on them that like, that is full of sugar. They actually. Sure, sure. Yeah. Bottles. Yeah. Well that's interesting.

And so would you put exogenous ketone, you would put that as kind of the drink that, you know, particularly like football players and these kind of athletes are drinking as they're, you know, rehydrating obviously they've got minerals in them.

you know, throughout the game. Exactly. And like electrolytes are super important, right. and as they need to replenish those because they're losing them in sweat.

So now you have BHB bound to these electrolytes. It's kind of the perfect combination for most of these athletes. Yeah. Because when people are drinking something like Gatorade, really the best benefit they're getting is water and salt.

And I mean, they've got a ton of chemicals and processed ingredients, but even just water and salt, you'll notice a difference in your performance. Right?

but then you add in the ketones there and now and obviously the non sugary flavoring that's makes it easier to more palatable to drink. And you know now it's easy to drink. It's enjoyable.

And you know you get that added brain benefit. 100%. Yeah. Now how about somebody that's dealing with cognitive decline. Or maybe they've got a family history of cognitive decline.

They're worried they're getting, you know, up there in age what is a good way obviously outside of nutrition, the things that you were doing with your mom, getting out, getting steps, things like that.

if they wanted to use exogenous ketones, how would you go about like, how would you recommend that? Yeah, it's and it's super it's super difficult, especially if they've if they're more at the more advanced stages like dementia and but a great friend and colleague of ours, Doctor Mary Newport, actually wrote an entire book on this and talks about it with her husband, Steve.

so he was struggling with it. She was one of the first ones to ever utilize exogenous ketones with her husband. And she talks about it as like he was, like completely unresponsive, couldn't do anything.

He went from being like this rock star accountant to dementia, slowly started taking away his life and like he couldn't do anything within like 30 to 60 minutes of him taking out of his ketones.

She said he was dancing around the house. He was cleaning dishes. Like to be able to change someone that quickly. Like there's just not many things like that that exist.

And so we've been doing some research with Parkinson's at our lab, and we've seen people who come in who have like, tremors in their hands, and within 30 minutes of taking ketones, like they're able to just like a standstill.

And so it's like, and we're we do eye tracking movement. We're doing cognitive tests with these individuals. And within 30 minutes they're seeing rapid improvement.

So for those type of people, I would recommend, you know, it's hard to change their diet, right. Because to get them to change up what they're doing is going to be extremely difficult.

You don't want to argue with them. But like like you mentioned, trying to incorporate in MCT and coconut oil into their diet would be a great step one.

And then step two would be like, cool, how do I get exogenous ketones? Do I have maybe one, 2 or 3 servings per day spaced out to make sure I'm trying to constantly get ketones into their brain, even if their diet isn't the most optimal thing.

Yeah, and also even just taking exogenous ketones, even though we kind of laughed at that earlier, like, okay, if you're going to eat a a bad diet, it's not really going to have the effect.

But actually there is like a slight blunting of insulin and blood sugar. There's a there's a slight blunting there. you know, so it's your blood sugar is not going to rise quite as much or insulin isn't going to go up as much.

It's going to have less of an inflammatory impact when you are to take something like exogenous ketones or putting MCT in your food. And so, you know, going back to, you know, food preparation for people with cognitive issues, cooking in MCT oil, right?

Can can be very helpful. Or just adding like a tablespoon to, you know, a salad or to whatever food the meat that you're eating because it's flavorless.

Right. And so you're just basically adding that in is not going to really impact the flavor. If anything, it makes it taste better because we tend to crave fat.

And you know what I mean? Like when we're eating our food. And so that can be helpful from that perspective. Yeah. And there is some data on ketones in ghrelin.

Right. and ketones and GLP one, which obviously is a very hot topic right now. but let's talk about that. Yeah. Yeah. So like he said, like if you are, for example, going to go to a buffet, maybe having exaggerated ketones 30 to 45 minutes prior to that buffet may be a really good idea.

And some people are like, oh, well, you shouldn't have both ketones and high glucose. But the concept is you're actually probably going to eat less than if you just went there a water.

You go, they're having some ketones and they will take effect solely Bon appetite. So that way instead of eating 2500 calories at the buffet, you might only 1800 calories.

And they've done a study on that. So it has a satiation effect, which is why people are taking Ozempic and the what

Govi and the various GLP one agonists of semaglutide.

which is when I heard the number one medication, you know, that's being prescribed now basically, and so, you know, there's obviously huge demand for a satiety provoking medication where you can use exogenous ketones, not just get the satiety, but then also all the added benefits of, reducing inflammation, supporting mitochondrial health, cellular energy production.

So, you know, a much better alternative from that perspective. And then, like you and I were talking about also protein, a lot of good research on prioritizing protein.

When you get your protein levels right, you're going to have that natural satiation, and not overeat as well. Exactly. And one of my best hacks, and this is one of my best tips for people when it comes to protein, is like a lot of times our protein shakes the most ideal thing. No.

But if you're in a bind, is it better than having some junk? Yes, absolutely. And so I always like to say, how do I take my protein? And if you're someone who tends to overeat, how do I increase the volume of it?

Right? How do I so like Greek yogurt is very high in volume. Right. Some of these lower sugar Greek Greek yogurt options. But also say you're making a protein shake instead of just taking protein, throwing it in a shaker bottle, shaking it up and run out the door.

If you have some time, take that same protein shake, put it in a blender with some water and ice, and by blending it, you're actually adding air to it.

As I know it sounds crazy, but you're adding air. And so if you go to pour that in the same blender or the same bottle that you were you were going to pour into for, you might need two of those same amount of material, but by blending it you just increase the volume.

So when you drink it, you're going to get more satiety. Because we know the stomach has a finite amount of space and you're taking up some more of that space by blending it.

So that's a little hack that I tell people. They can maybe try blending it up and adding a little bit more volume to it. Yeah, it's a good hack. And with my protein shakes I like to add in either coconut milk or we get.

We also get raw grass fed milk from our local farmer. Right. But both of those have a lot of medium chain fats, the MCTs that are in there. And so those are good sources for the liquid in your protein shake.

You put your powder in. You can also throw avocado in there. Right. which actually makes it more of like a pudding. I love the flavor of it. Throw in your, you know, your frozen berries if you want that.

and that makes a really, really good shake. That again will add more volume. Right. Which will give you the satiety.

Longevity, Healthspan, and Personalized Protocols

Not that. Yeah. Well, let's talk about let's finish up with just what you're most excited about, what you're working on with your research and what you're most excited about in this space.

Yeah. we're I'm fascinated with the anti-aging longevity concept, where we're diving deep down that rabbit hole right now. and so there's been a lot of talk about, like, biological age.

Healthspan. So we're actually working with some government agencies to try and help solve the crisis that is currently existing, in part with a lower carbohydrate diet, I think is one of the crucial elements to that.

Intermittent fasting is a very important element to that. But what's happening right now is this huge issue in that lifespans actually increasing, meaning the amount of time that we are living on, on this earth is increasing right

back in our grandparents day.

They might only live till 5560. Now, on average, we're living to 80, 83 years old. and that's only going to increase. So but the problem is healthspan is decreasing, meaning you might live to 83 years old, but your health starts to take a nosedive at 50.

Well, what happens for those 33 years that's full of sickness, disease and suffering? And so that is a huge burden on the health care system. Sometimes that's a huge burden on your family to to do that.

So how do we help close that gap. How do we make it? So if you're living at 83, at 82 years and 11 months, then your then your health starts to take a nosedive, right?

That would be a very high quality life. And so we're trying to figure out how do you take that on the massive scale and make it simple for most people to do and I think a lot of times we can get wrapped up in biohacks and this and I gotta, I gotta eat this certain thing or I gotta do this.

And it's like all those things can amplify and accelerate and be very good. But like, let's nail down the basics. and so that's, that's one of the areas we're focused on right now is like steps, right.

Ideally everyone should be hitting at least 7500 steps per day. If you have no idea what your steps are, you can go on your phone, go to your health app or Google Fit app and see, on average, most of us carry our phones around with us all the time.

That gives you a pretty good indication. Or if you have some type of wearable, it gives you that information. Make sure you're staying hydrated, right?

Make sure you're drinking enough throughout the day. make sure you're incorporating in some type of intermittent fasting, right? For most people, I think probably fasting around 14 to 16 hours, is pretty good.

the the average is eight, right. Think about how crazy that is. Like, you're like, wait a minute, how's it eight? Like, don't people sleep eight hours?

That means people are eating from the time they go to bed. And the minute they wake up. And so there's a huge problem there. And then also making sure we're hitting protein goals and minimizing carbohydrates, like those are our core elements of what we're focused on trying to help people do.

Yeah, I love that. And and you know, intermittent fasting becomes so much easier when you get your protein right, your fat, you become satiated. And then like you were talking about 14, 16 hours overnight, you know, part of that you're sleeping really becomes pretty easy.

And you feel great. You actually feel really mentally productive when you're doing that. So it's it's it's an easy step as you're getting your nutrition right and your lifestyle right.

And so really, really key now, Ryan, I know that they can find you ketogenic.com. They can find a lot of your research and great work you're doing, but you're also working with a company Pro2col health.

Tell us what you're doing with that. Yeah. So, part of it is we're trying to take exactly what I just talked about and make it, like, digital for people to access.

So how do I have an app that I can track some of these things? I can track my steps. Nutrition. I have a protocol that's designed for me. I think a lot of people are.

We're going towards more and more personalized recommendations and right now that's the number one thing that people have is like, well, what should be my protocol?

Or do I want to do Dr. Jockers protocol? Like, how do I do Dr. Jockers protocol like so we're building a we're currently right now working on a software that will allow people to join different protocols, like I do Dr. Lowery's protocol.

Great. I can go in. And now this is how many steps per day? How many, his eating window, his nutrition, all of that. So that's a super, super exciting project that we're we're getting ready to launch probably towards the end of this year.

Yeah, that's really exciting because I think that's super helpful for people. And, you know, just like with all of us, I mean, I always say, you know, the your protocol really has to be personalized, but we can really move you.

We can get 80 to 90% of the, you know, of what you need to be doing down for you. And then from there, you're just kind of tinkering with it and seeing, you know, you know, little, little, little changes, little nuances that seem to work best for you.

So really good. I'm excited about your pro. And do you guys have a website out for that pro2col Health pro2colhealth.com. Yeah. With the number two is where it says pro2col instead of protocol instead of spelling that out.

It's a two instead of the T. Right. So look for that as well. Well Ryan, you guys are doing awesome work and, you know, really just want to commend you for all the great work that you're doing and, and, being a great voice in this space.

So thanks so much for your time. Any last words of inspiration here for our audience? Thank you, I appreciate it. I love the work you're doing as well.

and guys that at the end of the day, the goal is just getting 1% better each and every day. I think a lot of this can be sometimes people get overwhelmed and go, oh my gosh, I gotta do all these different things.

Do one thing, get started, take the first step. That's what matters. Yeah that's great. Well thanks so much guys. Dr. Ryan Lowery check them out. Pro2colhealth.com or ketogenic.com.

And thanks so much again.