Introduction to Ketogenic Diets

In this doctor talks, we are going to be exploring the ketogenic diet and the role that can have for health and weight loss. Joining me is PhD doctor Ryan Lowry, who has been on a fascinating journey through the world of health and wellness with over 150 papers, abstracts and book chapters.

Doctor and doctor Ryan Lowry is a sought after speaker throughout the world for his knowledge on health and longevity. So we're super excited to have him here with us.

He's worked@ketogenic.com helping people navigate health through, ketogenic diet as well as publishing the ketogenic diet. Sorry, the ketogenic Bible.

And he's shifted his gears and is now working on protocol health, which I'm sure he will tell us about as well. So, Doctor Lowry, thank you so much for joining me.

Thank you so much. It's an honor to be here. I'm super excited. So let's start with basics. What is a ketogenic diet? What is ketosis like? What does this mean?

Why are we talking about it? Yeah, by now, I feel like most of the world has heard of the ketogenic diet. It's been like an absolute explosion. And when we first started studying this, probably 15 years ago, people looked at it as a super high fat, very low carbohydrate, more of a low to moderate protein diet.

That puts you in this state of ketosis. Right. And what that means is that your body is essentially running on ketones versus what most people are running on, which is glucose from carbohydrates.

Over time, my kind of evolution of the definition of a ketogenic diet has changed. It used to be like you have to be 75% fat, 20% protein, 5% carbohydrate, right?

Like that's like the typical pie chart that most people see when they see a keto diet. But really, it's any diet or lifestyle that puts you in a state of nutritional ketosis.

The majority of the time is when I would say so. There are various different ways. We've done a ton of research on this topic, and you'd be surprised that some people can eat 250g of carbohydrates and still be in ketosis.

I I'm definitely not that person, but yes, either. I wish I wish that was the case, right? But there are some people who have a ton of muscle mass that just easily burn through that versus other people.

They struggle with 20g of carbohydrates to really get a significant level of ketones. And so there's this degree of bio individuality that comes with being in ketosis.

But there there are some pros and some cons of like really getting into the weeds of like, are more ketones better? Maybe. Maybe not. But I'm sure we're going to talk more about it.

Okay, well I can't wait to hear about that. But, I appreciate what you say because when I first started using the ketogenic diet for my patients, you know, I would have, you know, this sort of strict carb threshold that I didn't want them to go over.

And I did discover that there was a fair amount of patients who could tolerate more carbohydrate than that and still be in ketosis and still lose weight.

And like, good for them. That was great. And then there were other patients that, like you said, really had, a lot less

flexibility with how much carbs they could eat.

Ketosis Basics and Carb Flexibility

And then also I, you know, I don't like to have too specific of numbers for my patients because I don't like them to have to count everything for the rest of their life. I think that's a hard way to live.

But I did find that a lot of my patients, did better with a little bit higher protein than the higher fat. And it really was maybe we'll have better testing and things someday to predict who is who, but really just experimenting and seeing what their body responded to.

Was was what we ended up doing, keeping in mind some basic principles. So powerful to hear you say that. But you also were like, okay, this is how it has to be done.

And then over time, I had seen like, you know, people's bodies are different. That's it. And things change. And I think we saw this explosion of like keto products, which also caused a little bit of, confusion and headaches with like, what about net carbohydrates?

Can I just subtract out all the fiber? Can I subtract out all these sugar alcohols? And it's it gets a little bit into the weeds of like, well, maybe some of them.

Yeah. You can subtract out. They're probably inert. They really don't have a response. But some of the others, they certainly will have a response. And they will probably leave you running to the bathroom because you're going to have so much gi, so many GI issues and so much gas and bloating.

So, it really got a little bit challenging. But there's it really comes down to it's not a perfect science of like, every single person needs to be eating this exact same thing.

There's this degree of like, you kind of got to play around with it to figure out what works best for you. Yeah. So, what you did mention, like, you know, and I think now I just have to have the answer now of, like, does the amount of ketones matter?

The degree of ketosis. So tell us what you know about that. Yeah. So early on it was funny. We used to in our lab here in Tampa, we used to always be like, oh well we used to compete like who has the highest ketone?

Or if you come in every morning we would test and yeah, I beat you like I'm higher. I'm a 1.4 and you're only at like a point seven millennial. And so that got us questioning like is is higher ketones always better.

And I think the answer is it depends. And it actually may maybe worse. If you have higher ketones. The reason being is we shouldn't be chasing ketones, we should be chasing ketone utilization.

And what we've seen is that over time, the people who are on a ketogenic diet the longest, the people who are intermittent fasting the longest, the people who have the highest amount of muscle mass.

And even if they're utilizing things like exogenous ketones, they actually tend to have a lower fasting blood ketones than people who are maybe novel or new to the ketogenic diet.

And if you think about it, makes sense, as we as we're on a ketogenic diet or as our body is starting to get more and more used to utilizing ketones, we're going to upregulate the transporters that take up and utilize them.

Right? We don't we don't necessarily want them in the blood. We want them into tissue. We want them into our brain. We want them into our muscle. We want to be utilizing ketones, not necessarily just having them sit in blood.

And so during my dissertation, I actually created, this thing called an oral ketone tolerance test. We're all familiar with, like the oral glucose tolerance test.

So basically I was like, well, what if we took people who are on a ketogenic diet versus people who weren't on a ketogenic diet, gave them each ten grams of exogenous ketones, and just see what happens.

And every single time that people who are on a ketogenic diet, when you give them ten grams of exogenous ketones, their ketone levels actually over time.

And this was chronic, their, their, their ketone levels tend to go down compared to people who are ketone and novel are not really on a ketogenic diet.

There's a first time they're ever seeing ketones. Sometimes their ketones stayed elevated over several hours, and their body did not have an ability to clear it.

Right, because they didn't really have the transport capacity necessarily to lower that. They weren't taking it up into tissue as well as the people who were on a ketogenic diet.

Very interesting. And that kind of makes sense of what we see clinically when we'll just check someone's urine and they seem like they shouldn't be in ketosis.

Yet we're checking it for some other reason, right. Like medically. And they have ketones. And I'm like, gosh, why do you have ketones? Right. But they probably don't have that flexibility.

They're not clearing it because they're not used to being in ketosis. Exactly right. Yep. Very interesting okay. So you mentioned intermittent fasting.

Can you talk about the role of intermittent fasting with ketosis? Yeah, I think intermittent fasting is a great tool for most people in context.

Ketone Levels and Utilization

Right. Do I think some people take it to extremes and you start getting probably some decrements. Right. Probably this inverted you with intermittent fasting like no fasting at all, which is probably 90% of the population in the US.

Where there if you look at the average eating window for people in the US, they're probably eating on average between 16 and 17 hours a day, which you look at. Then you're like, wait a minute, I'm doing the math here.

Basically, they're not eating when they're sleeping, right? They eat all the way up until they go to bed, and then they eat first thing in the morning.

And that is also a problem. We know the repercussions of that. But then on the other end, you have the extreme people who go like do 24 hour fast every other day and it's like, all right, well, you might start to run into some issues there with some protein deficiencies and, and minimizing or limiting muscle mass unless there's some type of like really clinical issue that, that requires.

So where is that sweet spot. And so what we tend to see is like 14 to 16 hours of fasting most days of the week is great. An occasional 24 hour fast is perfectly fine.

But people who are on a ketogenic diet tend to, be able to fast a lot easier. Right? When I first started, intermittent fasting, like it was, it was hard for me to, like, come close to skipping breakfast.

I'd be like, I used to have to eat breakfast at like 8 a.m., and by 830 I was like, oh my gosh, I have a headache. I can't do this. What's going on now?

Because it's like a routine. I can easily go 1112, 1:00 if I'm working or doing things, partially because I have an alternative fuel source to help keep me focused, which is ketones.

Right? So the reason why most people struggle with intermittent fasting is because you tend to run out of reserves, right? And then you start to get this hangry, you start having low blood sugar, and that's when things start to go haywire. Right?

But when you have ketones as an alternative fuel source kind of kicks in and goes, hey, we still got some fuel here. We can keep going. And one of the things I want to touch on with intermittent fasting, and it was just a brand new study that came out, there was a new study that looked at intermittent fasting, and everyone's looking at this right now talking about, oh, intermittent fasting is dead.

There's no benefit to it because this study took individuals and they had one group do intermittent fasting about a ten hour eating window, and they had the other group, do you know, intermittent fasting, basically eat ad libitum whenever they wanted to eat.

But what they did was they match calories and they match protein. So it's like, oh, great, a highly controlled trial, which is fantastic, except that's not how the real world works, right?

We don't match calories in everyday life. No one's sitting there going, hey, here's your exact calories. Ryan. This is exactly what you should eat when you should eat it.

No, we go to the grocery store and we go down the candy aisle and some people go, oh, I don't know that Snickers is calling my name or you go out to eat and you're like, I might get two appetizers instead of one.

So, that's not how the real world works. And so intermittent fasting isn't maybe some miracle or something that's doing things, but it is a tool in the toolbox that can help people easily eat a lot less calories when they're struggling with that issue.

Yeah. So I think it sounds like that study was trying to see if the metabolic effects were purely the benefit from fasting. But that's not all that we're shooting for.

I often say when I'm first working with someone that, you know, my big job is to help kind of control hunger and appetite, because that's the big variable, right?

Like, we all can do the math and figure out what we should eat, but actually doing it is is hard. And that's where strategies like medication or surgery can come in.

But one of the strategies I utilize is ketosis because ketosis in and of itself suppresses appetite. Right. And now it becomes easier to stick to this nutritional strategy because you're just not as hungry.

And you've described some of that metabolic flexibility that occurs as well too. Right. Like you, you know, the first week you do it, it may not be that easy, but the longer you do it, your body gets used to running on ketones.

And now you can go longer periods of time without eating and so that's one of the strengths of it. Right. Is is it works beyond just like exactly what you're eating.

It has these other biologic effects, these other physiologic effects that we're trying to get as well.

Intermittent Fasting and Appetite Control

100%. Yes. So yeah, so I mean, that study showed one thing, but it doesn't mean that there's no role for for fasting. Exactly. Right. 100%. Yeah. Okay.

So, you know, I feel like actually ketosis and we may have different perspective on this is not as popular to me as it was maybe 5 or 10 years ago. And one of the struggles I've seen for my patients is their ability to stick with it long term.

So do you have opinions or thoughts on how people can make this strategy something that's more effective as a long term strategy, or does it does it need to be a long term strategy for people?

Yeah, I think I think that second part of the questions is the the important one is like, does it need to be something you're on forever? And my stance on that is, no, I don't think you need to be on a strict ketogenic diet.

20 473 65 for the rest of your life. I think periodically going into periods of ketosis for what some might say is an extended period of time is a great tool.

Not saying, oh, I'm going to go into ketosis for three days and then go out and then back in. We actually did a study on that, and it doesn't seem to to work as well where you like, people will go, oh, I do ketogenic dieting Monday through Friday.

And then I blow it out on the weekend and then I do it again Monday through Friday. That actually doesn't tend to work. Well, you never really get into ketosis.

You're kind of right on the border in line, and you don't feel great doing that. But do I think going maybe 8 to 12 weeks, periods of time being like, hey, I'm going to Hampshire, hunker down, I'm going to I'm going to do a pretty strict ketogenic diet and then transitioning out to maybe like a lower carb than a moderate carb, and then kind of transitioning back in, I think is a great tool.

And there's actually some studies showing that that's how you kind of keep progressing, right. You kind of continue to see results. I think some people will see a pretty substantial decrease in their weight if that's their goal. Right.

And we we here at our lab look to look at body composition on a Dexa like fat mass and muscle mass. So their body composition in that. But people will tend to lose a lot of weight early on on a diet.

And then they get frustrated come a 12, 16 weeks and they're like, I'm not losing the same way I did the first two or 3 or 4 weeks. And it's hard to be like, hey, that that's that's expected.

You're not always going to have this linear decrease in body weight, but something that can kind of jumpstart things or kind of keep them going is transitioning from, hey, maybe let's pull the fat down and increase the carbohydrate, which I know sounds crazy to say when we're talking about ketosis, but slowly increase them.

And I'm not saying go and eat 500g of carbohydrates, but instead of eating 50 now you might bump yourself up to 100 or 120 and then work your way up to 150 for like a medium carbohydrates.

Now you can start incorporating in some of the more fruits or low other carbohydrate sources that you wanted, that you maybe didn't have on a ketogenic diet.

So I think you don't need to be on a caring diet for the rest of your life. But cycling in and out of periods of being in ketosis, I think is a great, great thing to do.

I think that's really helpful information. But I agree that the sort of like, weekend warrior mentality of, you know, I do keto for five days of the week, probably you're not getting the full benefit, especially if you really kind of go crazy on the weekend and and just do whatever you want, then you're probably not getting any benefit, maybe even some harm to to that sort of up and down that dramatically big time.

Yeah. And we saw that like people we actually did a study on they called cyclical ketogenic dieting. And what we see is that when you do say eight weeks of a ketogenic diet, we actually were the first ones to show this was back in 2013.

We looked at individuals on a high carbohydrate diet, individuals on a ketogenic diet. We match protein intake. And we were the first ones to basically show when you match protein intake, you were able to gain just as much muscle, get lose a little bit more fat on a ketogenic diet.

Right. And so we published that, but then we did another one with a cyclical ketogenic diet. And we actually found that the individuals on a cyclical ketogenic diet lost muscle tissue.

And part of that is because ketones are muscle sparing. They have properties about them that kind of help break down or prevent the breakdown of muscle mass.

And there's actually some animal data we did that show that they actually maybe anabolic, ketones. And but when you don't have that when you're going Monday through Friday and ketosis and then kind of eating pizza and then on the weekends maybe, you don't really have that.

You don't have ketones high enough to have that sparing effect.

Long-Term Keto and Cycling Strategies

So you tend to lose muscle mass. So you I think you mentioned a little bit about exogenous ketones. Can you tell us what those are? And if I know there was some data previously that those maybe helpful with weight loss, what's the current thinking about exogenous ketones and weight loss.

Yeah, I think exogenous ketones are a great tool. I similar to the keto products that came out during the explosion of the ketogenic diet. I think there's people have a misconception of what ketones are because people are putting them in and fake apple cider vinegar gummies and keto pills and things like that, that just are nonsense, but actually effective doses of exondys ketones can be a fantastic tool.

And again, that doesn't mean to go eat a Big Mac and drink your ketone and say, hey, I'm in ketosis. I'm good. That's not how they work, right? But there is data showing that consuming isagenix ketones, say, 30 to 45 minutes before a meal can actually increase satiety.

So hence you might eat less during that next meal. But we're actually we're doing a lot of research here at our lab right now and exaggerates ketones for traumatic brain injury, Alzheimer's and Parkinson's.

Because a lot of these individuals, a lot of those three conditions have very similar properties in that your brain, as we get older, but really with Alzheimer's, Parkinson's, traumatic brain injury, your brain starts to become more and more resistant to utilizing glucose as a fuel.

Right? Some people are actually calling it type three diabetes. And so, but your brain can use this alternative source of fuel called exogenous ketones.

And so as much as I want my almost 90 year old grandfather to go and say, grandpa, you're forgetting some things, I need you to go on a ketogenic diet.

He's Italian, and he would beat me over the head and go, Ryan, I'm not doing it like he's just not going to. He he he's 90. I'm not going to argue with him. He's going to have his pasta.

But can I utilize exogenous ketones as a tool for him to maybe help him have a little bit more energy throughout the day, maybe forget a little bit less?

And the answer seems to be trending towards yes, they can be a great tool for like a two, three, 4 or 5 hour spurt before you need to reintroduce another dose to allow that individual to kind of turn the light on, so to speak.

Very cool. I'll keep my eye out for that. That's exciting stuff. Let's talk a little bit about exercise or movement training, whatever. Word resonates most with people.

What are your thoughts on that and the role that has with with a keto diet? Without a keto diet, what should people be thinking of? Yeah, I think the goal for most people is one just start, just try and get some type of movement in.

And I think a lot of times people will overanalyze this, right? They'll go, oh, well, I need to hit the gym five days a week. No ifs, ands or buts about it.

And then what happens is it becomes, paralysis by analysis, and then you either go too hard, too much, or you just don't go at all. What we've seen is if you are short on time, right.

I'm I'm a new dad. I don't have a ton of time to go train. So I have to be super efficient with that time. And so there's this concept called high intensity interval training.

And we've done actually some research at our lab. Compare varying high intensity interval training, short burst quick sprints versus like 60 minutes long steady state cardio on the treadmill.

You know, people will go on the treadmill on the go for 60 minutes. And we compare that to three 30s all out sprints with two minutes rest in between.

So we did it on a bike where you would sprint all out as fast as you could for 30s rest two minutes, and then you did that three time right? And we found we looked at metabolism and long term changes in body composition.

We found that they were basically equivalent. And you actually gained a little bit more muscle on the cycling, the high intensity cycling than the long term steady state.

But like if I can do three minute, I'm basically three minutes, 3 to 5 minutes versus an hour. Which one's a little bit more efficient. Right. So I think for most people it's finding what works for you, doing whatever type of movement you can.

For some people, that's just getting steps in. Right. Trying to hit 5000 to ideally 7500 or more steps a day is great, but try and get some form of high intensity interval training, ideally some form of resistance training as well.

Exogenous Ketones and Brain Health

Inside of that if you can. And that'll be a great start to your week. I like talking about that high intensity training because, I am across that. I'm a level two CrossFit coach.

And, I also run marathons, which are totally different things. Right. And I sometimes we'll joke after we do a high intensity workout at CrossFit that's like, you know, 6 or 9 minutes long with rest in between.

Right? Sort of like you were explaining that I'm like, that was harder than the marathon, right? Because, of it just exert your body differently. It really, really does.

So, and like you said, efficient. Right? So, the trains your body in a different way, but but it is much more efficient than working out for, for 60 minutes.

Absolutely. And what you do is incredible. So kudos to you because those are competing adaptations. Right. Like it's very it's kind of a bad idea to do both at once I wouldn't recommend.

Yeah. It's like you're trying to gain muscle, get more run for a long duration. So kudos you. That's incredible. Well, that's a good transition to my next question was actually about muscle.

So you mentioned a little bit with the keto diet. But let's talk about how people can prevent muscle loss when they are losing weight or when they are dieting.

Yeah. And I think the key and it's it's crazy because we're seeing this right now, not just in the keto space, but with the explosion of Ozempic and, and GLP one drugs like the number one thing that can help someone prevent that, besides resistance training is increasing your protein intake.

And so like I was saying earlier, early on, I was like, oh, you got to be careful because you eat too much protein. It's going to result in this process called gluconeogenesis.

It's going to knock you out of ketosis. We typically don't see that, especially when it's in context of a mixed meal, meaning like you're not just drinking a straight protein shake.

Like if I'm having a bigger steak. Great. I'm getting in more protein. So I think most people I feel like night and that song, like 99% of their problems will be solved.

Yeah. If just all they did was eat more protein. Especially I see this in women, when you. Because they're trying to eat out a calorie deficit, they're intermittent fasting and then I'll ask, I'm just like, hey, just track a day for me and let me know what you're eating.

And then they send it to me and they realize they're like, oh my gosh, before they even send it, they're like, I'm not eating that much protein. I'm like, what did you have like 30g?

I'm like for the day for the day and that's it. And it's like that is that's below the RDA. And I think the RDA, eating at the RDA is basically just meant to prevent deficiency.

So it's like you really need to make sure you're prioritizing protein at each meal. And I think that's something that could help everyone. Yeah. Story of my life doing my review with my patients.

And I'm like, wow. Just quick estimate in my head, you maybe about 30g of protein. So let's try to bump that up because I like rough numbers. So, you know, I have most my women shoot for around 100g.

But sometimes I'm like, let's start with 60. Like, let's see if we can get you to 60 right now because again, I see the same thing where, a lot of people, when they're cutting calories trying to lose weight, they cut the wrong one.

And now they're not getting that protein in which you need to keep muscle. But I'm sure you've seen this, and it sounded like you've seen this with some of your keto protocols.

But, you know, I've actually had people who put on muscle and we can track this. We use an in-body in our clinic, but we can see that they have put on muscle wall.

They've lost fat sometimes a tremendous amount of of adipose or fat tissue, but we're able to actually put on muscle which people will tell you you can't do.

Exercise, Muscle Retention, and Protein

But but you absolutely can do if you're doing the right exercise and the right nutrition. I can agree more. I think that's one of the biggest misconception that people have, is there's no way you can gain muscle and lose fat at the same time.

And we see it all the time we do in bodies and dexs here all the time in a lot of our trials, and we see it all the time. Well, it's they say you should never ask a question you don't know the answer to, but I'm going to go out on a limb here because I don't actually know what your protocol health is.

Sorry, I'm not so sure if I'm saying that. Right. But, what is it? Tell us about it. Yeah. So we've been working over the last year and a half, basically building a software that allows you to essentially create your own protocol.

And so it won't be launched until January of 2025. But essentially the concept is each person should have their own unique protocol. Not everyone is the same. Right.

So there's Ryan's protocol. There could be Jane's protocol. Susie's pro. Everyone has their own unique protocol. And for us, I think with the anti-aging longevity market, there's been a lot of great things that have come in.

But there's also been a lot of confusion. And when we look at it, the things that move the needle the most are actually the simplest. So things like hitting your protein intake right, keeping carbohydrate at a reasonable level, hitting your daily steps, hydration, sleep, exercise wise.

And these are all things that we incorporate. And so we're developing an app, an online, dashboard where you will be able to one not only be able to do like at home diagnostics from your biological age, Healthspan score blood testing.

And we've developed a whole algorithm and score for each of these. But then we can design a custom protocol for you, or you can design your own protocol based on those kind of core for metrics of like steps, nutrition, intermittent fasting, hydration, and then at home.

Workouts, like I said, are simple at home 15 minute workouts that you can do without weights. And so we're we're launching that here in the US. And then we have a, B2B side that we're actually launching internationally with a pretty big government agency in the Middle East to really just help on a massive nationwide level.

Move the needle. Right. Because right now, if you look at Healthspan, it is declining rapidly. And so people need to do something about that if you want to live and be able to me, I have a whole new lease and perspective on life, like my goal now that my son was just born is like, I want to be able to play with like his grandkids, right?

So like that's kind of my thing now is like, not only do I want to live a very full life with him, but I'm already looking like generation and generation, like what I do today is going to impact if that's able to happen or not.

And so I think a lot of people need to kind of look through that lens of like, we really need to look at the quality of our lives and figure out how to improve.

Healthspan I love it. Yeah, that's really, really, really exciting stuff. And with you on the like, it's all about how well we live, not just how long we live.

Right. I think everyone's starting to pay a little more attention to that. Well, looping back to ketogenic diet, I want to make sure people feel like all their their questions may have been answered here.

If someone is contemplating a ketogenic diet for the first time or going back to it, maybe they knew it worked for them in the past, but they stopped it for whatever reason.

Where it was life, or someone told them they should stop doing it, which happens quite a bit. What advice would you have someone who is sort of starting that journey, for the first time, or maybe for a repeat time as they endeavor on that?

That's a really good question. I would say that keep it simple. I think a lot of times people can get try and make it too complex. So my recommendation is the first two weeks are the most important.

Like if you're going to embark on a journey of say, six, eight, 12 weeks and you're going to say, I'm sticking to a ketogenic diet those first two weeks are going to be very, very important.

One, if you've been eating a bunch of carbohydrates to kind of deplete those glycogen stores and get you into a state of ketosis.

Protocol Health and Practical Keto Advice

So I would recommend one supplementing with electrolytes, because that becomes very, very important. When insulin is low, you start to excrete out a lot more electrolytes in your urine.

You need to bring those back in, especially sodium and potassium, and, and magnesium. And two is make sure you're focusing on a whole Foods first. Right.

It's very easy nowadays to go to Amazon and go keto products. Or go to go to Costco now and you see something that has keto on it. And next thing you know, you're like, oh, I'm, I'm eating a keto diet and they're eating keto chocolate and Akito cookie and the keto bar.

And then this and it's like, those things have their place and they have their time, in context. But for the first two weeks, try and focus on whole foods and then slowly you can incorporate in these other things.

Ideally you're making things at home. There's a bunch of amazing recipes that are available everywhere online. Now. There's all over the place. Make things at home if you want to be creative, but the processed stuff that you want to get at the store, hold off on those till after the first two weeks and slowly more name if you are going to do that.

Well, it. Thank you so much. And you know, one of the coolest things about this summit with, with 40 plus guests is how consistent that message, regardless of what your strategy is of eating more whole foods, eating the real foods, prioritizing those.

If there's one message from this, this summit that's consistent, whether it's plant based, keto, using a method like that has been the take home message.

So cool to hear it. One more time. Well, thank you so much. Doctor Lowry, I really, really appreciate it. And I actually learned a lot, from, from your talk.

So thank you so much. Thank you so much for having me. I'm honored to be here. Thank you.