Steph: Hello cliff and welcome back to the show.

Cliff: Thanks Steph, good to be back.

Steph: Yes, it's been a little while, so I'd love for you just to set the scene with our new listeners, as to a little bit of your background, and certainly where you spend most of your time working these days.

Cliff: Yeah, I guess the elevator narrative, is that I started in practice about 23 years ago now, working as a nutrition coach, nutritionist, personal trainer. And I was one of probably the first practitioners, to really start going into keto and low-carb, it certainly wasn't because it just felt like a good idea, or because I was trying to be contrary, it was really because when I was studying first time around at university, a lot of the guidelines that we were given simply didn't make sense when I started to work out, how much say fat someone required, how much protein they required to be healthy.

There often wasn't enough in the diet left, to give them this arbitrarily high liberal carbohydrate that we'd been told, so that led me to go down the path of using various types of diets with clients, whether they be very low-carb, or low-carb or moderately low-carb, and because I was applying different types of diets, some being very low-carb, others being probably quite a lot higher in carb, I started to develop that concept that I call the carb appropriate, which is really trying to modify the diet to the individual, basically finding the right diet for them, based on their condition and their activity levels, and a whole range of other factors.

And so I went through practice for a long time, doing those types of things, eventually ended up back at university when the team here at AUT started really looking into low-carb and ketogenic research, so I went back and did my master's degree and doctoral research in MCTs and ketogenesis, and particularly began to focus on what could basically predict the type of diet somebody should be on. And so now I still work in clinical practice, but my primary role I'd say is as a researcher and educator, so I'm still involved in research, doing scientific research on various types of diets, starting to look at various other avenues of health as well, and I teach nutrition through the Holistic Performance Institute.

Steph: Very cool. I love it. So, little...
Cliff: I love it too.

Steph: Yeah, yeah, good. You’ve obviously got a good balance of all the areas that you’re really passionate about, and I’ve been privileged to work beside you with Melrose in the past, and I love hearing you speak, and I thought for today, it’d be really great to start to just go through some of the more recent research around MCTs, and ketosis, and that individualised prescription which you and I have spoken about before, but both certainly love to use as a lens to prescribe. So one of the more recent pieces of research, that came I think through well originally through Macquarie University in Sydney, was titled medium chain triglycerides supplementation increases postprandial ketone bodies in a dose dependent manner. So I wanted to give you the opportunity to talk more about this study, as I know it’s certainly an area of the space that you love.

Cliff: Yeah. I think that study, It was interesting because it was just another piece that added to that body of research that has been pretty clear that MCTs are ketogenic. In other words, when we take those MCTs, they will be preferentially converted to ketones in the body, and so they will increase those ketone levels, and there was previous research showing that was linear, it was consistent, it was dose dependent, and this was just another piece of that puzzle which shows that MCTs do increase ketones, and it is obviously dose dependent, in other words, the more you take, the more you’re going to increase those ketone levels.

And that really, it also speaks to some of the research we did. This one in particular was looking at the increase in ketones straight after meals. Which is very interesting because if you add MCTs to meals, obviously you’re going to get that increase in ketone production. But that in some respects is fairly self apparent, and I think most people would suspect that anyway, or would expect there to be an increase in ketones if they’re adding, say MCTs to a meal, or if they’re taking MCTs in a shake or whatever. We looked at it slightly different in some of our research, where we had people taking MCTs throughout the day, and then we were testing the blood ketones first thing in the morning after a fairly long fast. So it would have been about a 12 hour or more fast after their last meal, in the previous evening, and we found that there was still a very consistent effect on ketone levels.

Now what that tells us, and when we marry it up with research, like the study you’ve brought up, is that not only do MCTs increase that short term ketone production, but they’re also increasing a medium long term ketogenesis. In other words, they’re encouraging the body to be producing ketones out of other fats as well, because if that weren’t the case, then the MCTs that people had taken on the previous day, probably wouldn’t have been having the same type of effect the following morning, because they hadn’t had the opportunity to take MCTs for at least say 12 or more hours.

Steph: Right. Okay. I guess that’s a really interesting angle, like you said, that’s contributing to what’s already been looked at by yourself and others. Now with this particular study, what they were looking at doing, is increasing doses of the MCT oil, in increments of 15 meals per week, for seven weeks. So in week one they were consuming zero, and then in week seven, they were up to 90ml, divided into three daily doses. That’s obviously 30ml times three, by the time they got to week seven. So can we talk more about specific doses, and what you’ve learnt, and we might
need to break it down into obviously who we're talking about, because I know this particular study was more related to Alzheimer's, and was an abstract at the Alzheimer's Association International Conference. So before I go on, let's talk more about those specific doses to start.

Cliff: It's a clever way to do it because it's very much, I think transitioning into translational research, which is critically important. We can do a whole bunch of research in a Petri dish, we can do it in mice, we can then go further down that progression and do very, very controlled studies on people in metabolic wards, where we're feeding them exactly what they need, all that stuff. But we also need to get to a point where we're applying things in a way that we would in clinical practice, which is not always the way that we would apply it in a very strictly controlled study, because life gets in the way. And one of the cool things about showing dose effects, and tolerance to different doses and things, is that it starts to give us some idea about what we can do in practice. Now, I think you and I would have done this for years anyway, when we start someone on MCTs, we don't just suddenly put them on two tablespoons three times a day, because most people wouldn't be able to tolerate that.

Although that's actually, just as an aside, the dose we used in our MCT study, that was a pretty high dose, but most of the time obviously, we want to attenuate people or acclimate them to MCTs, we might start even on a very low dose of say a teaspoon, and then maybe increase the frequency of that, so maybe a teaspoon three times a day, building up to two teaspoons, maybe up to a tablespoon three times a day, and then basically say we were at, say then we might be getting up to those threshold doses of say two tablespoons three times a day.

I'd say for most people, that is a decent high dose, and while it might be tolerated by most people, I don't think there's necessarily much reason to go above that, and there is some evidence, I'd like to try and recall it actually, that if we get up to 45 grams or more, so three tablespoons or more in a serve, and are taking that multiple times per day, then that can begin to adversely affect blood lipids, but I'd have to go back and check the studies, to remember exactly what that is.

Steph: Yeah, that is fascinating, because I know in this study in particular, they were obviously donating fasting blood, but the observations that were also made at the end of the study, was that despite the increase in their consumption of MCT oil, there were no negative effects on BMI, or fasting trigs, or total cholesterol, or anything like that. Which I think is really interesting, because as we talk more about MCTs, there is still that fear component for a lot of people, because it's a pure fat. So I think this is a good measure to understand that, for the subject studies at least, they can get up to 90ml a day, without negatively impacting their blood lipids. So do you think that it's above 90ml that we start to see an issue, or we are talking more long term, because the study was only relatively short term of course.

Cliff: Now I think it is in the relatively short term, if people are taking really excessive doses. But what we also need to consider is that there's typically a far lesser, or no effect on blood lipids and what not when people are taking MCTs, especially when that's basically corrected for with diet. What I mean by that is if they're substituting some of their normal dietary fats with MCTs, they might even experience improvements in their blood lipids, because the MCTs are not going to affect things
like triglycerides and fatty acids in the blood, as much as say a standard dietary fat, which is typically a long chain fat. Now, certainly not that the long chain fats are bad, it’s just that MCTs have particular properties where they’re not quite so easily maybe stored, and they’re not quite so easily, carried around in the blood in the same form, they’re more likely to be converted to ketones and all sorts of things. So we are getting at lesser impact their on blood lipid profiles through substitution.

I think that’s one of the important things for people to remember is, it’s not just about adding a whole bunch of extra fat on top of their diet. It’s that when we take different types of fats, they’re often supplanting other fats in the diet, if you know what I mean.

Steph: That I totally agree, and I laugh because often people will say to me, "I did an MCT coffee, and it just didn't work for me. I felt like I was getting fat." And I’m like, "Okay, let's break down what you’re eating, and look more closely at your macros and everything." And of course it often comes out that they’re trying to do relatively high-carb, and then adding fats as well, and we know that they've always got that seesaw type relationship. And as in, if you’re adding an MCTs, then usually you’re taking out a carbohydrate and if you're not, then it can be problematic certainly over a period of time.

Cliff: Yeah. I think I might've even told you this story years ago, but one of my clients... it wasn't actually a client, that's a lie. Someone had contacted me and asked why they weren’t losing weight, so we had a little bit of an email discussion before that person came in, and I asked what they were doing. I had seen through an idea of what they're eating at the moment, and it looked pretty damn good to be honest. It looked like the diet you’d write out and put on the fridge and say, "I'm doing really well." So I went back to him and said, "Is there anything else that you're doing? Are you taking any supplements? Are you doing anything else to try and get any other benefits?" I really tried to dig down into what was going on, because we hadn't had a proper consultation at this point, so I didn't have all the information I needed.

And the person came back to me and said, "Well, I am taking three tablespoons of coconut oil before every meal, so that I can get into and stay in ketosis, because that's the way I figure I can lose body fat." And of course I immediately thought, well, 45 grams of extra fat, before each meal.

Then I did the maths, that's a lot - 135 extra grams of fat in a day, we’re talking about well over a thousand extra calories that are being chipped in. This idea that people have that energy or calories simply don't matter, if you’re on the right type of diet. It’s obviously not correct. There are a lot of nuances within where our calories are coming from, that have a massive impact on how easy it is for us to free up body fat, or to function at our best. But there is still that first law of thermodynamics, which is critically important. And that's if we're putting in just way too much energy, the body can't compensate by up-regulating metabolic rate enough, and we're still going to, at the very least be resistant to body fat loss, and we might be more prone to putting on a lot more as well.

Steph: Yeah. It's more complicated than this, but if you’re consuming that much coconut oil, then the only fat that you’re burning is your dietary fat, you’re never going to be
burning body fat. So 1200 calories off your teaspoon from coconut oil per day, is for some people, more than they'd be eating in a whole day. Not that I recommend 1200 calories a day, but that's the volume that we're talking about in what that person that you were speaking to has added on to their overall intake. So you can definitely eat too much, and fats obviously super easy to overeat, especially if they're in almost liquid form.

Cliff: Exactly. And that also speaks to that idea that a lot of people have nowadays of, we call it chasing ketones, people wanting to be higher and higher and higher on those ketone readings, because they figure the higher the better, because if they're higher in ketosis, they're deeper in ketosis I should say, with high ketone levels, then it's supposed to mean they're burning more fat. But of course if the ketone levels are high, because they're simply pumping in a huge amount of dietary fat, and they are in that ketogenic state and they're producing high levels of ketones, it certainly doesn't mean they're going to be losing fat. It probably means they going to be resistant to fat loss, because they're just putting in way too much fuel. And so this why I try and counsel people not to chase ketones, more so chase the healthiest diet for you, and often that will for some people be ketogenic, they will end up being in ketoses, but there's no point just arbitrarily trying to push the levels really high by eating a truckload of fat.

Steph: Yeah, I think that’s a really interesting point, and with the whole biohacking craze that we have, I do like that up to a point, but then what I see is people getting too crazy with their devices, whether it’s their CGM, or their ketone measurements, or whatever they're buying off Amazon.com, and they're getting really wrapped up in those numbers. I’d love to get your opinion on this. If we don’t change our diet, but we become more efficient over time in utilising those ketones, aren’t they then being burnt as a fuel, and not available to be picked up in a reading on a ketone meter, so we could get a false negative?

Cliff: Yeah, absolutely. I think it’s fairly clear that there is a certain level at which most people will end up in, it’s a bit of a proxy number, it's relatively arbitrary, but we still think it’s somewhere around 0.5 mmol of beta hydroxybutyrate in the blood is roughly ketosis. But if someone is slightly lower than that, it doesn’t mean that they’re not producing a lot of ketones, as you just suggested. What it can mean in some cases, is that they’re simply using those ketones, and turning them over very quickly, and so because of that, they won’t be exhibiting those levels consistent with ketoses, but it doesn’t matter, we then need to look at what our outcome is. If someone wants to be achieving a certain outcome, whether it's a performance outcome, or whether it's to lose some body fat, or they've got clinical outcomes they need to be achieving, more important than some arbitrary number is, are they achieving that? What else is happening with the health measures, or their blood markers of health. What’s happening with their body composition, muscle to body fat ratios? Most importantly perhaps, how are they feeling, how are they performing, what’s their energy like? All of those qualitative things are critically important as well. And that's why we obviously did some of that research in the lived experience of a ketogenic diet, because we wanted to drill down a little bit more into how people felt, because at the end of the day, that's the most important thing. It's far more important that someone is feeling great, and happy, and has a
good mood, and all those types of things, rather than just seeing some arbitrary number on a blood parameter.

**Steph:** Yeah. Which you can do with any degree of food quality, which we can often forget is one of the most important decisions we make. You can get to 0.5, or 1.5, or whatever you want to do from a millimole of BHB, but you could be eating rubbish, you could be not eating your six serves of veggies a day, and so on and so forth. So we've got to remember that food quality is the priority, and I don't think that getting caught up in measuring is the right thing. This circles back to our previous discussion around carb appropriate. We say the word keto, and people will get to 0.5, or 1.5 mmol on very different levels of macros. And that's where we've got to really remember that it's very individual. I know some people that can be producing really appropriate levels of ketones, and they're having almost 200 grams of quality carbs a day. And then we will see others that need to be much, much lower than that.

**Cliff:** Exactly, exactly, and there's a lot of individual variability... if we want to call it that tolerance to carbohydrate, how much we benefit, versus are a risk from higher amounts of carbohydrate, obviously activity plays a massive role in that as well. The more active you are, it doesn't matter whether you're on a keto or low carb or higher carb approach, you're still going to need more carbohydrate relative to your current diet. So I think people really need to get out of that mindset that different diets are defined by an absolute gram amount of carbohydrate. And what I mean by that is, a lot of people will say, "Well, to be in ketosis you have to eat under 20 grams of carbs per day." Or they might say under 50 grams of carbs per day. Or then they'll say, "Well, if it's about a hundred grams, it's not keto, it's a low carb diet." But as you see it's so variable between individuals, that you can have people in ketosis on 100 grams, or 150 grams, or 50 grams, it becomes somewhat meaningless.

It almost gets to the point where if we take a step back and get away from the numbers a little bit, and take a quality approach to nutrition, and let's say we think our client will benefit from a low carb diet. And we just eliminate the obligate carbs in that first phase. so they're eating meat, vegetables, nut, seeds, healthy fats, all that good stuff. They will probably end up in ketosis because there's not enough obligate carb there. But it won't really matter whether at the end of the day, they're eating 20, 30, 40, 50, 60 grams of carbs. That's somewhat inconsequential. They will probably still end up in ketosis, or at the very least, they'll be producing a lot more ketones, because that's simply what the body has to do. We also think... I know I'm rambling a little bit here, we also come across that situation where people think that being in ketosis as an on-off switch. You limit your carbs to a certain point and then suddenly you ramp-up your ketone levels.

Now, that happens to some degree, but it's also a spectrum. We'll see people on the standard American style diet, who are about 0.1 typically. But then we might see people who follow a Paleo, or Primal approach, might be 0.2, 0.3, maybe even 0.4. They're just sub what we consider ketosis. But a lot of times they're eating lots of carbohydrates, just from natural and unrefined sources. And then once people eliminate the obligate carbs, that's when they start to get up over 0.4, 0.5, 0.6, so very much is a spectrum that's based on the totality of your nutrition, not just some random and arbitrary carb allocation.

**Steph:** Yeah, it's not an on-off switch. I love that explanation. Were you always so sensible?
Cliff: Well, I think so. I think that's why I got into this thing, because I looked at the numbers and thought, this doesn't make sense, but I also gravitated very quickly to simplifying approaches, because it can become very complicated for all of us to be looking at nutrition and having to constantly worry about how much energy I'm taking, how much protein, carbohydrate, fat, and all these other things. Trying to put all these intricate pieces together, when in reality... Sure we might need to do that occasionally just to check in and make sure we're on track, but for the vast majority of time, we and our clients want to understand nutrition more conceptually, and just basically be able to look at our plate and say, "Yeah, that looks good." With a couple of palm sizes of protein, may be three, four sizes of veggies, and some added fats, it's pretty simple.

And it's not over simplifying to the point of diminishing returns, it's actually simplifying to the point that we can be consistently taking in good quality food, so that we can be the healthiest we can be over the longest period of time.

Steph: Yeah, no, I totally agree. I want to stay on this study for a moment, because the volume of MCT, I find quite interesting. You've been mentioning that I think... correct if I'm wrong, your studies are based around roughly two tablespoons a day, so 30ml, am I right?

Cliff: 30ml, three times a day.

Steph: 30ml, three times a day?

Cliff: Yeah.

Steph: And in this particular study, it was more about acknowledging that MCTs are the ideal energy source for patients where their brain is really needing a lot more ketone bodies like in Alzheimer's disease, so just how do we decide whether we need 90ml a day? Because it sounds like a lot to me.

Cliff: I think it is, and the reality is I think a lot of people are going to experience gastrointestinal challenges at that dose, they may not all the time, but they might from time to time, and they certainly could if they haven't acclimated to it. In terms of the dosing, I typically get people to start with that lower dose of say a teaspoon. Build up teaspoon by teaspoon until they feel that... if they feel anything and the gut whatsoever, we'll either stop there and pull it back by maybe a teaspoon to find their consistent everyday type of dose.

Now that doesn't necessarily tell us what else needs to be done in their diet, but if someone wants to be taking MCT, I figured then that's a good way to see how much they can take. And then they can adjust from there, based on everything else they need to be doing. The question often comes up, then well, can you do that in a diet that contains carbohydrate? I believe that you can, because the reality is, you're going to be taking in some dietary fats anyway. No one's going to be devoid of fat, even on a higher carb diet. And I typically suggest that people want to take in 30% or more of their calories from fat anyway, even if they are on a fairly high carb diet.

And so some of that can come from MCTs, and that does provide particular benefits. Obviously like you say, for the brain and central nervous system. And that's a pretty
interesting area of research, and I think it's one of the most promising areas of keto research in that whole neurodegenerative, and also in the traumatic brain injury and concussion space.

Steph: Me too. I'm fascinated by that because it only just... for most people they probably haven't even heard the news, but the fact that things like Alzheimer's are being looked at in that type-3 diabetes, or through that lens is quite profound that we can start to really reverse it with our dietary choices.

Cliff: Absolutely.

Steph: That's huge.

Cliff: It's interesting because let's say we look at diabetes, or we look at Alzheimer's or other near neurodegenerative disorders, because there is that association with the very high carb diets and things. Now what we're typically looking at, there is not actually the macronutrient distribution of the diet, in reality. What we're really looking at there is that when diets are excessive in carbohydrate, it's typically because people are choosing refined foods that are very high in carbohydrate, particularly sugar. And so that's that end of the spectrum from where people are eating a lot of... or drinking soda and fizzy, and eating lollies, or whatever it happens to be. On the other end of the scale, we can see actually some negative effects from what appears to be low carb diets, but they're actually not low carb diets per se. What they are is, people choosing refined foods that are higher in fat, and concomitantly slightly lower in carbohydrate, like burgers, and pizzas, and what not.

Steph: Vegetable oils?

Cliff: Well, sure. Yeah, yeah, absolutely. And so when we take a step back from either extreme, because a low carb person's going to pick up that the research shows that there's an association with high carb diets and say, "Here we go. High carb diets are associated with Alzheimer's," then maybe a high carb diet advocate will pick out the other research which shows all of these outcomes for people eating low carb. But really they're not actually consistent with the data. When we actually dig into the food data, what we see is that the people in that middle band who tend to do best, it's not because they're eating high or low carb, it's because they're eating real food.

You're eating more vegetables, it's more nutrient replete. So they've got nutrient dense unrefined diets, and time and time again now, we're seeing that the research is showing that that's the key for prevention. But there can be... circling back to low carb and keto, and other things that might help with that process in the body, there can be some specific benefit for maybe having those higher ketone levels, particularly for neuro degeneration and preventing that process, but also once people are on that pathway obviously helping to treat that through a whole range of effects from reducing plaques and misfolded proteins in the brain, through obviously just fuelling brain cells that have become damaged over time, through to addressing over excitation in the brain within itself, can be toxic for neurons. There's a whole bunch of things that are happening there, and it's really interesting because it's like there's this accumulation of various things all working towards the same goal, which is to have a healthier brain.
Steph: It's incredible. I'm going to go on a little bit of tangent here, but we have to understand how simple it really is. If a brain is deprived of glucose because of insulin resistance, it needs a secondary fuel. It needs to be able to use ketone bodies for energy. But then we still hear people like those vegan doctors interviewed for Game Changers, that are bang on committing to the fact that the brain must use glucose. Why are some people so behind? What's going on there? Why are we still not acknowledging how important ketone bodies are for the brain? Big question.

Cliff: It's simply that people are not aware of the research. And I think people aren't aware of the research, and they have often such strong positions, and they've basically created their identities on particular conditions, or worked with particular positions, I should say, that it's very difficult to shift from that. But I think that's where we really need to be pragmatic. We need to be evidence based and we really need to try to step back at least from any of the biases we have. To look pragmatically at the research and say, "Well, what does this actually mean?" And I think a good example of that is... when I'm teaching, one of my courses is based on teaching the science behind ketosis and ketogenic type of things. When we talk about diabetes prevention, I'm very clear with my students that if we look at the research as it stands right now, we can't necessarily say that a low carb diet is best for preventing diabetes, because there's actually not that much of an effect from different diets, so long as they're based on unrefined foods.

So we might see really good results from Paleo, Primal, Mediterranean, low-carb, and especially those variations of those that are based on good quality natural foods, like lots of vegetables, and good quality proteins that help with fat and all that stuff. But when we get to the position of actually having metabolic syndrome or diabetes, I think most people who actually understand the research would say, well if someone actually has diabetes or metabolic syndrome, then the best intervention for them is low carb. Because the systematic reviews, Meta-analysis of the research tell us that it reduces average blood glucose levels by about 150% more than the supposed best practice diets like the Mediterranean diet. So we can be pragmatic and say that, it probably doesn't matter too much for health overall, and the protection of health, what people eat so long as it's based on real food, but in certain instances we need to understand that clinical conditions, require particular interventions.

I think if we look at it pragmatically like that, we can pretty much all get along, because we don't need to be stuck in one particular bias towards a diet for everything. That just doesn't exist. No two people on the planet that are exactly alike.

Steph: Yeah, true. I think coming back to the research is the point though, because of course this particular research around, acknowledging that the brain can live off other fuels than glucose is relatively new compared to, what we once thought like... gosh even though how many decades ago it was.

Cliff: It's new, but it's not that new. It's a bit of a surprise that there are some people who are still out there saying that the brain can only use glucose. And if it doesn't have enough available dietary carbohydrate, the brain is going to start to die. And all these things that we hear from fear-mongers. We know from research back in the 1960s... we certainly know from early epilepsy research going back about a hundred
years, that when people were following ketogenic diets, there simply wouldn't have been enough carbohydrate to provide these supposed amounts that the brain tissue and nervous system use, and so there had to be something supplying the fuel there. So the suspicion was always there from a hundred plus years ago that the brain could use other fuels. It was relatively quickly shown and right through the '60s, '70s, there was fairly compelling evidence presented that that was the case. You go back to some of Cahill’s early research where they were IV'ing insulin into patients, so their glucose would plummet, and also IV'ing ketones into them.

So their blood glucose would plummet to a point that should be creating hypoglycemic coma, but it didn’t, and the brain cells weren't dying. The neurons weren't dying because they were also supplemented with these ketones. And so that shows pretty clearly that the ketones have an effect on the brain and they can obviously supplant that glucose reliance, for the brain and the central nervous system. So the evidence has been around for a long time, it just takes a long time to filter through, particularly to undergraduate level education. I think that’s one of the big challenges is we have a lot of people who go into the sciences, and do their undergrad science degrees, and it’s almost like it’s simpler just to say, "You know what, the brain relies on glucose." Which is actually true, but then to say that it only does that, and it can't use other fuels, that’s obviously just scientifically incorrect.

Steph: Yeah, and I agree with you. The research has been there for a long time, but it’s almost like it was hidden throughout the high-carb craze, that we went through in the Western world, and now everyone’s opened their eyes to the fact that, we've essentially had the wool pulled over our eyes, we're really starting to unpack. Research that might’ve already been there, that might have always been there, but we were blind to it.

Cliff: Yeah, and I think one thing there is... you're 100% right. It's because if you have a position, in which basically the idea is that very high carb and very low fat is the best, there is still some acceptance within that model of say higher fat, lower carb approaches being okay, but generally not desirable but okay for certain health conditions. And that's why, the ketogenic diet was always there as a potential therapeutic for epilepsy. But outside of that, no one really looked at it in greater depth, because it would seem to be such an unfavourable diet for other outcomes. It was seen to be so bad for cardiovascular outcomes and all these types of things, as people then realise that that wasn’t the case. And in fact it didn't really fit Anthropologically, to just have people eating massive amounts of carbohydrate irrespective of anything else going on in their life. And we’ve started to realise that, fat's not an actual absolute risk factor for cardiovascular disease, and neither is saturated fat and all these types of things.

And that starts to shift the whole conversation, when people start to re-evaluate why we had this position in the first place. And why the evidence is telling us something quite different to what position statements that aren't based on evidence have been telling us.

Steph: Yeah, fascinating. So do you take 90ml of MCT per day?

Cliff: Not at all.
Steph: I'm fascinated by this volume. That’s all.

Cliff: Yeah. We certainly found in our research... and it was a relatively short study because we were basically looking at just the keto induction phase, so we had a relatively long study relative to the time it takes people to get into ketosis. But it wasn’t a long study by study standards. It was only a three week study. And we had people taking that 30ml three times a day, so they're taking 90ml, or six tablespoons of MCT a day, and we found that overall, their symptoms of what's called keto flu, or those symptoms of keto induction, were probably much better than those who were taking the control oil, which was a long chain fat. They probably had better mood and a whole range of other benefits, but they did experience greater gastrointestinal distress and that’s a fairly well known side effect of very high doses of MCT, of course it’s not a problem with lower doses.

And so I think for most people, most of the time, it probably is right on the threshold there of what they probably could tolerate, because I’m not consistent enough with acclimating myself up, I don’t take that volume, I probably take one to two tablespoons, one to three times a day, depending on how many shakes I’m having. I basically just chuck MTCs in my shakes and that’s my simple approach to it.

Steph: Yeah. And is that the level of detail that you would teach your client, when you’re not working with someone, that’s after that therapeutic effect like in this study where they’re looking to treat Alzheimer’s?

Cliff: Yeah, typically. Generally I will have worked out what their macronutrient requirement is, and they won’t necessarily be interested in the calories, and how many grams of this and that they should be having per day, or per meal, but I will give them that information, they don’t need to track it, but I’ll also translate that into a diet plan in which they’ll have a smoothie option, and it will be consistent with what their meal should require.

So yeah, it might have one tablespoon of MCT or it might have two, it might have differing amounts just depending on what they require, but obviously there is some value in having other fats as well. And so I will often have MCT and maybe mix that up with that as a smoothie, and maybe have some nut butter in there as well as MCT. Or they might have some fish oil with their MCT in it as well, and they’ll be using other dietary fats in their meals, like olive oil and what not.

Steph: Yes, of course. Interesting...

Cliff: Because especially that combination of MCTs, and Omega-3s I think is really powerful food.

Steph: Yeah, absolutely...

Cliff: Because DHA being such an important component-

Steph: Of the brain.

Cliff: ... of the brain and so important for cognition, learning, memory and all those types of things, you see this almost a synergistic effect I think between MCTs and DHA in
particular. But also what a lot of people forget, and a lot of the work that I've done recently is looking at both MCTs, and Omega-3s, and things like that. And because we think so much about the effect of MCTs on ketones, we often don't think about their effects in the gut, and feeding beneficial bacteria, and helping to correct dysbiosis and being one of the key evidence based treatments for candida overgrowth, and things like that. And Omega-3s too, are very beneficial compounds for helping reduce dysbiosis in the gut. So those things again, working hand in hand, are pretty powerful combo.

Steph: Yeah. Because I would probably get my clients to have 70% to 80% of their fats from Omega-3s, and there just wouldn't be room to fit that many tablespoons of MCT on top of that for most people, because that's 800 calories in itself, if you were to do that 90ml. So I think it's important to acknowledge that difference in dosage around therapeutic effect versus what you might add to a real food diet, which is going to be predominantly Omega-3.

Cliff: Exactly. And I think when you are working with people who have neuro degenerative disorders. I want to phrase this correctly. You tend to be a little bit more extreme than what you would with your average gen-pop type patient and that's because with those neuro degenerative disorders the survival times are incredibly low. We're looking at three to nine years survival time post diagnosis, for a lot of those conditions like Alzheimer's, and it's generally because diagnosis is a little bit too late as well, because we wouldn't realise that the creep in effects they're experiencing. But because there is such a short window, you're going to really be quite precise with what you're doing.

You're going to have higher levels of MCTs, you're really trying to get the ketones up a little bit more to really provide that fuel, for the brain and central nervous system and all the other ancillary benefits. You're obviously going to be providing those Omega-3s as well, but it's going to be, probably that little bit more intensive than what you would need to apply with someone who is wanting to prevent those things later in life, and just to be as healthy as they can be now.

Steph: Yeah, totally different priorities. I appreciate that. Fascinating. It was a relatively small study, but one I'm interested in seeing a lot more around, do you have anything like that coming up around Alzheimer's? Are you doing more TBI stuff?

Cliff: Well, I'm not doing any TBI research myself, there is some going on at AUT, and I'm just loosely involved in getting with the guys about that, and giving my input as to what I know about keto and things. It's a pretty slow progression in the TBI space because there's so many different things being looked at right now, that there's only a limited amount of time for any one university or researcher to be looking at different things, and there's a lot going on in the creatine space. There is going to be more and more I think for MCTs and exogenous ketones, and ketogenic diets, lion's mane mushroom, there's certainly going to be a lot going on. One of my areas that I'm particularly interested now is... it's fairly broad actually, and we've got a whole bunch of projects that we're potentially going to launch into.

So we're really very much in a formulation phase at the moment, but a lot of it's geared towards the general idea of anti-aging, or reducing that effect of cellular degradation over time. There's also some interesting stuff around various
mushrooms, that we want to look into, whether they'd be the memory and learning and cognitive effects of something like lion's mane, right through to the long term health benefits of maybe even psilocybin mushroom and things. So we've got a lot of various projects that could start, and at the moment we're basically trying to pick what we can or can't do.

Steph: So we'll stay tuned for that. But the last topic I wanted to explore with you today was around an article that was published in the British Medical Journal. It was last year I believe, but it's in relation to the World Health Organization guidelines, which keep on telling us to reduce our saturated fat consumption or to maintain it around 10%. So wanted to get your thoughts on that, and what we should be doing with those recommendations and our saturated fat intake.

Cliff: It's an interesting one because, I think the claim is always going to be that with a significant amount of saturated fat, there is almost like there's a proxy... it's a progression by proxy, and I'll explain what I mean by that. When we have increases in saturated fat, or we have populations that are eating more saturated fat, there generally is an association there with LDL cholesterol, and total cholesterol as well. And so because those also have an association with long term, cardiovascular disease mortality outcomes and that's pretty much where a lot of the guidelines come from. They're still relying on that progression through saturated fat, and through increases in LDL and total cholesterol-

Steph: The correlation.

Cliff: ... there's an association. Yeah exactly. And so you've got to secure these multi-step process. Whereas when we just look a little bit more simply, and this will come with some criticism as well. But when we look at it a little bit more simply in terms of the true effect of saturated fat versus all-cause mortality outcomes, there's really nothing there. We can't see a consistent effect of increases in fat overall, or increases of saturated fat and those long term endpoints, particularly cardiovascular mortality, and more particularly what's most important when we're looking at a population level, all-cause mortality. And so because we don't see that direct link, really it obviously throws into doubt any of the recommendations to drastically reduce saturated fat, mainly because it also complicates dietary guidelines.

It complicates things from a public health stand point. What I mean by that, when we tell people to reduce this, and increase that, and maybe watch out for this and eat more of that, it becomes very difficult for people to actually apply that. Now, if you're looking for low salt, low saturated fat, low total fat, you've got all these things you're looking for, you're going to end up eating a whole bunch of refined food, pretty much. It's also going to be very confusing obviously, to make those supposed best choices when you're shopping. But then in contrast to just having more conceptual ideas of how I want to eat more unrefined foods, you don't have messaging going out there that, "Hey, we should just eat more vegetables." Or, "Hey, if it looks like it fell off the tree, or out of the farm, or it looks like an animal whatever." Then you should probably eat more of it.

Cliff: People actually understand that a bit more, and so I think one of the big narratives that's coming out in the discussions between researchers, is that we shouldn't be over complicating things when the effect sizes are very, very small, or when we can't
see their consistency of effect. And this particularly came out in the recent systematic review in Meta-analysis of the events around red meat, and mortality outcomes.

Now, is there an effect of red meat on mortality? Probably. Is it confounded? Almost definitely. Is it...

Steph: Hell yes.

Cliff: Yeah, exactly. Is it very small? Yes. Because it's so small, should we really be focusing in on that one thing, when it may not actually be an effect at all? And if it is, it's so tiny, it's probably having no meaningful effect. This is that whole idea of clinical meaningfulness. We need to look at that, and not just look at the supposed statistical significance for a whole bunch of modelling that people do, because that's not the way we actually get the best results, because it's distracting.

Steph: Yeah, it's confusing. That's clear, because people are so paralysed with what to do because... you're right. It's been really complicated, and this conversation around the guidelines. I know there's a researcher from SA, where she's really trying to push a conversation around whole foods. Like, "Why don't we take away the focus around, specific macronutrients, which doesn't mean much to the lay person, but talk about whole unprocessed foods, which have way less harmful effects than what take away, and process food, and foods that might have some saturated fats, but are going to have vegetable oils and a whole host of human intervention." Then of course, yes, it gets very confounded because what that's actually causing the issue, like I'll put my money on vegetable oils, any day of the week, over a whole food based saturated fat. Eggs aren't going to kill us, for Christ's sake.

Cliff: Yeah. And it's very difficult in research to adequately correct, for all the confounding influences. There was a big study came out which was very heavily reported on the effect of red meat on mortality outcomes. And they tried to correct for things like smoking, and drinking, and activity, and also fat, it's very difficult to do. And when you see the raft of things that were also going on, it makes those very small effects on mortality, it's really casts them into doubt.

What I mean is that, those who are eating the... well it's actually framed in this way, those who reduced meat intake the least had the worst mortality outcomes. But coincidentally they're also those who drank the most, exercised the least, smoked the most, and had the greatest change in body weight negatively, over the course of the study. So they either didn't lose as much weight, or they put on weight. And so we're looking at a adiposity, we're looking at smoking, alcohol, lack of activity, all these various things starting to accumulate, and true we can try and correct for that statistically, but it's very difficult to do.

And if after all the correction that we've done, there's are tiny, tiny effect size, we'd have to say, well, that could well be within that margin of error, from our statistical modelling, and so it doesn't make a lot sense. When we look at the time in which some of these studies have been done, that's something people forget as well. There is a temporal aspect to this, where in that research, basically the cohort going through that long term observational study, it was during the time that people were
being told to reduce meat intake, and make all these other lifestyle changes, to reduce their risk of cardiovascular disease.

But you can imagine that those who were the most committed to health, would go to their doctor and their doctor would say, "Well, you know what? Your cholesterol is going up a little bit, so you should do all of these things. You should drink less, and you should exercise more, you should stop smoking, and you should also reduce your red meat intake." The red meat intake, at this point is basically a phantom. It doesn't mean anything, because it was the culture of health at the time. It was a very small part of the intervention. And the actual things that had the biggest effect, were all these various lifestyle things that had been put into place.

Steph: Absolutely. And then we keep blaming meat, and then just like coconut oil, which comes around on social media every couple of months, so too does red meat, and then we haven't even spoken about quality. We haven't even spoken about the difference between pasture-raised, grass-fed, grass-finished. And the worst of the worst in the outback of you know where, where there's hormones, and antibiotics, and grains and... the conversation is just... it drives me crazy, because...

Cliff: And how are you getting your red meat? That's a massive part. That's something that I'm always really interested in digging into, which I often do whenever these studies come out. Where the food data is available, I generally delve into that, because often, where people's meat comes from, and in terms of their diet, not even providence, just in terms of their diet, how are they consuming it? It's often a massively underestimated factor.

Again, it's like the earlier cohort, which showed that the low carb, those eating low carb died earlier, they weren't low carb anyway, but it's because they were in that burgers and pizza diet cohort. And yes, they were probably eating quite a lot of red meat, but it was coming from a lot of fast food. As compared to that, when we start to eliminate those things, and we look at people who were eating, let's say meat with lots of vegetables, and it's based on unrefined food. Those effects fall to basically nothing.

Steph: Any thoughts on why we're still having that conversation? Why every couple of months it's either red meat, or coconut oil being blamed? Is it again that we're just not looking at the research?

Cliff: I think it's in some instances, people aren't looking at the research, and that's especially true, I think, with coconut oil because it's very easy just to take a position where, well, coconut oil is predominantly saturated fat. Saturated fat does this and this and this, and then that leads to this. I's going through that process again in the same way. But if we actually look at the research on coconut oil specifically, we see that, you know what, it doesn't really have that raft of effects. In fact, it's probably a pretty good addition, or component I should say, of the diet. I don't want to say addition, because people start loading lots of coconut oil on top of their existing diet, I don't mean that all. But as part of the compendium of fats, that we use in a diet, it's great.

And one thing we also need to consider within that, is we've overly framed the debate around saturated fat. What hasn't been taken into account, is this other
component. We could have easily, just as easily chosen to structure things much more around short chain, versus medium chain, versus long chain fats. And look at the differences here, or what their functional endpoints are in the body. There's lots of different ways to categorise fats, and we've basically just fallen into this paradigm of looking at it solely as saturated fat, versus the rest, and then building all our models around that.

But now there's some really interesting research coming out, looking at the differential effects of say chain length. And that's an important part of the conversation to have as well, because we've discussed this before, the short chain fats are saturated fats, the medium chain fats are saturated fats, but they're not bad for us. They don't have this raft of negative effects unless we massively over consume them. And so that throws a lot of doubt on these arbitrary ideas that well, it's just that this whole class of fats is a problem, because obviously there's a lot more to it.

Steph: Yeah, it absolutely is. And so in this study, the statement is putting a blanket recommendation on saturated fat is inappropriate, because not all saturated fats are harmful to health. And that's what we've missed, for the last five decades.

Cliff: Exactly. And I would again go back to the whole idea of really re-evaluating effect sizes, because if we're seeing tiny, tiny effects, and it's based on a lot of modelling, then that can always be challenged and it can always be debated. So it's an interesting academic exercise, but should very, very tiny effects, that are open to a lot of very valid criticism, should they immediately transition out into public health guidelines? No they shouldn't. And I think a lot of journalists, and scientist, orders, and things need to be a little bit more aware of the messaging they are putting out as well, because it's very easy to seize on a study, blow it up with a clickbait headline, and have people being become even more scared and confused, about what they're eating.

Steph: Yeah, I just hope that is something that we can change, I don't know if I'm being too optimistic, but I just feel for the people that continue to get so confused, because of those clickbait headlines they just continue to come around every few months, as I said.

Cliff: Yeah, and I guess we can all understand where it comes from, but it's...

Steph: You're so diplomatic. Myself not so much. Big food?

Cliff: Well I think as well, we have to take some responsibility for it. I just wrote a series of articles, and I'm putting them out over the next couple of weeks, about the effect of a whole range of things on health, from social media, through to clickbait headlines, advertising, all that stuff. And the overriding concept that I began writing these articles under, was that we've got a problem with free at the moment. Now we're so addicted to free stuff, free information, free media, that we've put ourselves in a position, where's it's not actually free.

We get all this free media, but we have paying for it through our time, our attention, our stress, our anxiety, and through advertising. So obviously to drive our eyeballs onto a website, there needs to be, aggressive clickbait headlines. And it could be
things that are very emotive, that drive our anger, or drive our stress. And so we click on that, the media outlets hoping that we click on the advertising, but we've played into that as well.

So I think we need to take some responsibility of maybe not buying into that so much, and seeking out better, more unbiased sources of media, maybe being prepared to pay for some media, instead of this wanting everything for free. And my thesis, at least on this whole topic, is that if we do that, we'll probably end up actually spending less overall. Not just in terms of our time and our anxiety, but I think we'll actually end up spending less money as well, because we won't be so prone to getting those responsive, or reactive purchases. I know that seemed tangential, but it just... all I'm getting at there is that I think because we've driven that so much, it makes sense that reporters are trying to get more and more eyeballs on pages, by having more and more inflammatory headlines, and so that causes them to misinterpret research, almost disingenuously.

Steph: Yeah, it continues to the confusion, sadly.

Cliff: Yeah. Yeah. And then we all end up being confused.

Steph: Yeah. It's a fascinating space, there's so much more I want to talk to you about, but I think we will get you back on the show again next, to continue the conversation about the research in this space, but it was just absolutely so fascinating to have you on the show again today. Is there anything else that you want to share about what you're up to next? I know you've been pretty busy already.

Cliff: Yeah. It's a big year for us, we're really focused on just getting great, pragmatic education out through the Holistic Performance Institute. We really think that our mandate is because we are scientists in the space, but we're also holistic. I think we're in a pretty unique position, to be getting good information out there to people, so we're really just working on our course material. And aligning with a number of registering bodies, and all sorts so that our graduates can go on and actually be in this field, and be really good advocates for health as health coaches or nutritionists.

Steph: Yeah. So exciting. So that's the Holistic Performance Institute, or Holistic Performance Nutrition on social media.

Cliff: Yeah, that's the one.

Steph: Awesome. Thank you so much, Cliff. We'll have you on the show again very soon, but we're really grateful for your knowledge and time today.

Cliff: Awesome. Thanks Steph, my pleasure.