Steph: Hi Leighton and thanks so much for joining me today.

Leighton: Hey, thanks for reaching out, Steph. Good to be invited onto your show.

Steph: Yeah, absolutely. I’m really looking forward to learning more about SFuels, but certainly to set the scene, I’d love to just hear from you where it all began and what your reasons were and are SFuels.

Leighton: Sure. I think before jumping straight into that there's a lot of industry change as you're well aware and athletes in Asia and Australia are well aware. We were probably all trained in the 80s on the food pyramid model. For myself I was doing triathlon, cross country at the time, it was all high carb. In fact one of the ways you would impress your friends is how much pasta you can demolish or something like that. That was a very common, a proof point of how much training you were doing. But how things have changed. And for us, I moved to Asia out of Australia in ’03, ’04 spent nine years, actually, sorry, 13 years across Singapore, Thailand and Hong Kong. And in Hong Kong I started doing a lot of ultra racing.

It's a big scene up there. It's really prominent sport in Hong Kong, and anything from a six day race to 100 mile, 100k, 50k. And then we went over and did the Ultra-Trail Mont-Blanc a few times. And in that course of time, it became very apparent to me that the body was recovering in terms of speed of recovery was not what it used to be when I was younger. And that was probably the first trigger for me. I studied naturopathic medicine that I started raising the question of what's going on here. When I started doing study, I was looking at a lot of work from Tim Noakes at the time. More actually from a fluid perspective. But I began to read a lot of research being done actually by IRONMAN Group itself. And then a number of sports medicine studies being done at the ultra races on gut problems associated with simple sugar consumption during these races.

And it just started to dawn I think on me that it just didn't feel right, and we at that point hadn't really even started double clicking on the science associated with performance, with immunity, with inflammation, but it just didn't feel right. The more I kind of thought about just how much sugar was being consumed. In fact, we wrote a paper on this and athletes can be having eight spoons of sugar in a training session. And you only do the math by how many sessions they're having a week and you start to see, well, is can't be a good thing.
Forget about just the raw performance that happens in training or in a race. But over the years, what does all that mean for the body? So we started teaming up actually with Dr. Dan Plews in New Zealand. And I got in touch with some manufacturing and food technology labs in California. We started developing, we went through, I think 17 versions of our first product. Took us two and a half, three years to get something out that was meaningful. And Dan was really our test bed if you will, to validate it from a usage perspective.

And then obviously he was sitting inside of several of the universities there in New Zealand during a bunch of studies on heart rate variability. And he was also doing studies on low carb, high fat nutrition. So our real proof point was when we really teamed up then going into Kona for 2018, and we had run six months of use of the product and training with Dan. We didn't even have a race product at that time to be honest. And Dan went into Kona and he ran 8:24, which was the world record for the age group. It was actually except for the male pro - it was the second fastest run time of the day of 2:51. And he hardly consumed that much, he really didn't take much on the run at all.

Most of what he took was on the ride. So anyway at Kona that year we got approached by the agency of Dave Scott and Dave was speaking to us. He had been engaged with, classic high carb nutrition companies, big companies. And that was more than anything, a real feather in our cap to even just be approached by Dave, but Dave ended up joining the company and Dan has to and they just provide a tonne of experience as we build out a whole portfolio of products against living in a low carb, high fat lifestyle.

And then obviously training. And then lastly, racing. So very quickly, that's the story. A lot of devil in the detail under there. And we currently have our headquarters in North Carolina on the East coast in the US, and we still manufacturer in California. But we're shipping all around the world. We kind of ship and market direct, but we're right in the middle and kind of probably just reaching a maturity point as a company where we're starting to set up distribution around the world with different providers. So that's kind of the story so far anyway. There's more to be told.

Steph: Of course. I'm sure they will be. But I mean just for those that don't know IRONMAN like you and I do. 2:51 marathon off the bike is so incredible. And a lot of athletes know this story, because when Dan won the age group, it was one of the first times that we had that really solid proof around a low carb, high fat lifestyle, and certainly what it means to race at that elite level. Because I'm sure you've heard it before, the argument that we always get with someone who's gone low carb is that they're going to get slow, or they'll lose their top end. And that's a huge myth.

And certainly I always say, if that happens to you, you're not doing it properly. And so for Dan, racing and doing an IRONMAN in Kona of an 8:24 is yes, such great proof. So I can certainly see that times or the opinions changing since that race. But I'm just curious as to your thoughts on that and how it's taking up and how hard it is to move away from convention.

Leighton: Well, I mean from a science perspective, there's been several studies done on it, but the science is, it's all good. But the proof points is I think the ultimate lab, right? It's the ultimate laboratory to really evaluate if it's possible. I would just firstly call out
and from a philosophical perspective SFuels aligns to live and train low, and a race higher philosophy. So, the construct of that is that we believe that your ability for consistent training blocks lowered inflammation, faster recovery, by training and living low that's where the base or the performance is built.

And then when you come into a race, and we'll get into this when we talk about our TRAIN and RACE products, what happens physiologically to why we believe you should be having both carb and fat during a race. And we can talk about that and it's exactly what Dan did. So we can talk about the physiology of some of that, and how we've thought about our products as it relates to that. But you're right 2:51. It's a fast marathon. Even if you just ran a marathon, never alone after a hundred miles on the bike.

Steph: For sure. And I'm really glad you mentioned that. Because I'll admit, when I was first made aware of your products, it was by an American athlete that I work with from a nutrition standpoint. And I remember seeing SFuels TRAIN and looking at essentially the macros, and thinking to myself, we cannot be racing on this. And obviously that's not how it was intended. And of course you guys have expanded your suite. But I think it's a really important point because in the space there are still people who are either confused or trying to race without carbohydrates. And then that's another conversation that we're really trying to clarify. So we're not making these mistakes and undoing all our hard work of base training and training low as you say.

Leighton: Yeah. I think, like Dan and his team, our team, we've been advocating probably against a straight keto approach to ultra endurance racing. It's not that it can't be done, but, we don't know why you would not want to also oxidise carbohydrate and fat in a race if the body is set up well to do that. And that's the key is if the body's set up to do that, and your right, the train product, I'm not just going to spiel on the product here, but when we say TRAIN as naming the product, it's not just in the spirit that it is a product to be used in training. The product is designed in the context of trying to train the body on how to oxidise fat in training. And there's a nuance to that. And if that's your objective, then what you do in a product we believe is quite different. And we were well aware of what some of our competitors are doing.

We think there's also a very broad array. No one's a textbook case, so there's a very broad array to help people react to carbohydrates. So if athletes are looking to go down a low carb, high fat approach to training and racing, I think you have to know very clearly how your body reacts to carbohydrate. And of course best way to do that is probably a substrate VO2 max test, at different intensities. And you can really understand that, that will have a lot of bearing I think on what you do in training and racing. And without knowing that it's a little bit hit and miss to be honest.

Steph: Yeah, I'm with you. I think data is king obviously, and certainly it's something that we've been recommending for some time at The Natural Nutritionist and over at LCHF Endurance. But not everyone's still sort of doing it. I think and we are still guessing and then having races full of -

Leighton: It's not that cheap either. Right? What is it in Australia to have-
Steph: A couple of $100, maybe $200 but some of it will be under an exercise physiology from a private health point of view. So in my mind that’s not expensive at all. Especially when triathletes are notorious for dropping $10,000 on a bike.

Leighton: We’ve jumped straight into performance. I don’t want to detract from... though what I think if you look at the research on the DNF (did not finish) reasons on these races, whether it’s Western States, or Ultra Train Mont Blanc or IRONMAN what have you. It’s not because of structural joint problems. It’s not because of we ran out of gas. The biggest problems still number one by far is gut problems of why people are not finishing these races. And it’s kind of interesting that you would think that even the professionals with the access they have to science, and labs, and testing that this would have been resolved a long time ago. But we still see world-class athletes. Like on the weekend here in the US we just had the Olympic trials, the marathon, Jim Wamsley, he just ran 2:15, he’s an ultra runner. He’s a 100 mile. He’s just won Western States, he’s got the record there. He’s won that several times.

Well he’s had multiple attempts before he started winning Western States of completing that race and setting new records. But it was very clear that his nutrition and he was just having gut problems year after year. He’s still has had this problem at Ultra-Trial Mont-Blanc so again, even professionals with all the access they have struggle to get it right when they follow a high carb approach to handling these insurance sports.

So we think aside from performance, and we can talk more about that and we can talk more about the anti-inflammatory nature of this. And also even some really interesting data on immunity with this, but I don’t want to detract from, I think that mitigating all that gut risk out of the equation, so that when you spend, like you said, $10,000 on a bike, you don't put all that in the bin, because you get into the run and you just collapse, because your guts not holding up and it's very common.

Steph: Yeah. Absolutely. And unavoidable.

Leighton: Yeah. We wrote a whole paper on this called The ULTRA Gut. It’s up on our blog site I can give you the links later, Steph but we go through the science of all the factors. It's not just fructose and glucose, but it's what happens in the gut membrane. It’s what’s happening with dehydration and this just like this perfect storm of why you start having these issues. And anyway, it’s probably the most downloaded paper on our site because it’s clear that a lot of people have this issue.

Steph: Yeah, absolutely. I think again, if people yeah, it DNF, if it's the number one reason why people aren't finishing, surely it is time to change that convention. And you guys are obviously doing an amazing job of sharing the research so that we can stop falling into the trap of believing what we've always known. There’s a real issue with people that cognitive dissonance of changing because yeah, in certainly in IRONMAN space it’s been passed to parties, and just like you say that going to Sizzlers or wherever it might be and figuring out how much you can eat rather than looking at how to optimise your metabolism.

Leighton: Right. And I still think as athletes and even non-athletes lifestyles that move towards a more low carb, high fat lifestyle, there's still a quite a period of time where the person is still got this thing in the back of their mind of, should I really be having this
much fat? And it doesn’t come naturally to everyone because we’ve just had it ingrained of you know, grains are the bottom of the pyramid, and that should be the bulk of the diet. Right? So, there’s still this kind of transition and a lot of education still needs to be done on this. We need more companies driving this agenda.

Steph: Yeah, for sure. There’s a lot of fear in the space, especially big food doesn’t help. So, that adds another layer of complication. But if we circle back to TRAIN, I love that you’ve clarified your definition of the word train, right? Because it is about training your metabolism. So take us through... I love that you’re talking about that eliminating the spike in blood sugars because that’s the foundation that I believe people start to experience straight away when they make the switch to the lifestyle. And then obviously that transfers into training and racing. But yeah, I’d love to hear from you around the immune side of things and inflammation so we can kind of pick up all those benefits along the way and explore that physiology of becoming a great fat oxidiser.

Leighton: Sure. We had a few options to cost. Well, when we initially started the company we originally built a bar product, like a bar that you’d eat. And we since stopped that, but we actually came back out with it, but TRAIN was actually the second product if you will. And it was very evident that fluid as a format for bringing calories and electrolyte and other compounds into the body was probably the right format for the majority of these endurance sports, if you get into the true ultras a 100 mile plus, full whole foods we still believe is a critical piece to that. But coming back to TRAIN, so we decided not to have any carbohydrate in it more to the perspective like I said earlier around... there’s just so much variability if you actually run glucose tolerance testing on all of our products, we actually built them as, as we built them, we ran glucose tolerance testing to understand how the body would react to this in a classic... when you go to a hospital, you have a fasted glucose tolerance test. You typically do the 31-hour, two hour test of where your blood sugars are at relative to a certain food.

And we would do that with these products. And what we found was that any form of a carbohydrate foundation to a TRAIN product, frankly, even a racing product at rest would always have a more than desired spike in blood sugars. And that meant therefore your insulin was getting pushed. And then as soon as the insulin goes up, your fat oxidation goes down. So we stepped away immediately from building a train product on a carbohydrate. We built it on a MCT. Now most of the MCT medium chain triglyceride powders in the marketplace, they bind it, it’s very cheap to do this. You bind it to a Maltodextrin and you can create a powder sure.

But it just is total upside down to what we’re trying to achieve here, where you’re trying to go with low carb, high fat, and then you throw a whole bunch of carbohydrate in with Maltodextrin. So what we did is we worked with a company to actually bind it to a collagen. And it’s a little bit of protein, but I wouldn’t say at all that we’re trying to make this a protein product a such. So it uses an MCT and of that probably 70% is CA, which is one of the MCTs, which is of the various MCTs, it’s the one that can move through the liver and get assimilated very similarly to a carbohydrate would move out of the gut through the liver and then into the circulation. So it’s handled very similarly to that. But we don’t use a lot. A single dose of TRAIN is like 60 calories. Well that’s not a lot both in the context of the sport we’re talking about.
And then secondly, it’s not a lot as a comparison to other products. Our input with all of that and our thought process with all of that is, look, we absolutely need a hydration product. We certainly, as you get into the greater than two to three hour training sessions, you will need some form of fuelling. You obviously can be burning your endogenous fat stores. But what we're trying to do again is it’s not just about the burning oxidation of fatty acids in the muscle cell tissue and adipose tissue, etc. What we're trying to also do is teach the body through the liver and through the gut on how to assimilate fat into the blood so that as we get into racing, it understands how to do that.

Enzyme systems are set up to handle that efficiently. So as I said earlier, the TRAIN product is about training the body to handle fat, not just in the raw oxidation that happens at adipocytes but also as the MCTs triglycerides come through the liver and into the blood stream. We add quite a lot of electrolytes and by a lot, I mean if you look at most products and then you look at our sodium and potassium levels, you’ll see that they’re really quite high.

Part of this is because just by nature of pulling back when your carbohydrates, obviously your sodium count is reduced and you can have some serious fluid loss. So we try to compensate by having quite a high dose of sodium in our product. And then most notably we have a very consistent position on this through our products as we have quite high doses of glutamine.

And we can talk more about each of these compounds and why we put them in there if you’d like. But that’s essentially the summary of it. As I said, no carbohydrate in there. So we just don’t trigger the insulin and you’re really just setting up the body to switch on your fat oxidation capability as it, as it should happen. So, we promote using this up to four hours and at that point we’ve got some different approaches which we can talk about.

Steph: Yes. I wanted to clarify that point actually, because certainly in your quick start guide, your recommendations around using TRAIN and when you might add in RACE+ is relative to intensity. And I think that's an important point because certainly if you are doing a really low intensity session, that's the perfect session to train that oxidation. But for many athletes, I don't think they're training at the right intensity, things start to become moderate when they train with someone else. It might even be moderate to high, forgetting about the purpose of the training session and things get really messy because they haven't got enough fuel.

So even I find that really challenging to help someone understand the difference in intensity. And so you’re giving an athlete no carbohydrates for four hours to me is a little bit risky with all due respect just because they’re not going to necessarily stick to the right intensity. So I just want to get your thoughts on that and what you think about yeah, that intensity component.

Leighton: Yeah. So, if we just step back to what happens at rest and as we increase the intensity and also the duration at rest, the only way to get carbohydrate into the cell. Actually I should say the predominant way, by far the predominant way is some type of carbohydrate is a sensed by the pancreas and then insulin is secreted and then the muscle cells and other cells open up and that glucose can flow out of the blood and into the cells.
As you begin to... there is another way to get the glucose out of the blood supply and into the muscle cell without insulin. And that is essentially exercise. Now this is where things get untextbook like if you want to call it that, everyone is different. Generally our guidance is at one hour of... we use a rate of perceived exertion in our quick start guide more as a simplified way, but there’s certainly more technical ways to do this as you would well know, Steph. But at that point at about one to two hours, the muscular contraction and there’s different science and points of view on this.

Some would say that it’s the calcium levels in the muscle. Some would say that it’s nitric oxide. Some would say it’s reactive oxygen species, but these things that are released through muscle contraction can move the GLUT transporters that sit inside the cell right to the cell edge, and open up those channels in the muscle cell and allow glucose to come into the cell without insulin.

And the reason I explain all this is it’s really important because come back to what we said earlier about the carb, either the night before we have the carb at loading dinners or the morning of, we have this massive carb fest. What you essentially do by doing that is you have just switched on insulin production and you’ve just shut down your fat oxidation. What we advise both in training, whether it's a training session that we'll have high intensity training in it or a race. The first hour should be, I mean obviously we would say use SFuels TRAIN, but even if you use water where you are not doing anything to blunt or slow down the switching on of fat oxidation one and two, you’re not doing anything that is triggering insulin to be switched on. As you get that one hour plus into the high intensity training or the race muscle contractions have obviously been happening.

You've released these compounds, the GLUT-4 has moved to the cell edge in the muscle cells. Now you have the perfect system where the cell can both take in glucose without insulin and it can oxidise fat and you now have the ability to in parallel be oxidising glucose and fat to support metabolic flexibility for an athlete. That’s exactly where you want to be. So our guidance has been a quick start guide you call out is that at about one hour in, you should be starting... if it’s going to be high intensive training or race switching from a TRAIN formula into a RACE formula, the amount that you use as a bit of a discussion in its own right. But it does come back to how efficient the athlete has been set up in the context of fat oxidation and carbohydrate oxidation. And that again, points back to the substrate VO2 max testing that we alluded to earlier.

Steph: Yeah, I totally agree. Just on that point, when you're talking about the GLUT-4 transporters in the absence of exogenous carbohydrates, are you referring to utilising your muscle glycogen?

Leighton: Yeah, so muscle liver glycogen you can hold what to 2000 plus calories. So it'll be using that initially. You've probably, most commentators would say you've probably got two to three hours there, certainly now testing that's where it is, again it's interesting as a company, we've moved out of extremely humid environments in Hong Kong and Singapore to a temperate environment here in North Carolina. It’s amazing to see how much change you see in some of this data you thought you had right. Dramatic shifts, but you’re burning your endogenous carbohydrates and we
are all always burning some fat and some carbohydrate. It's just the amount of and the ratio of that shifts relative to intensity.

Steph: Yeah, for sure. That's an important point. So couple of things that I wanted to circle back to. I'm interested in the addition of glutamine because I think a lot of athletes are used to hearing about glutamine in that sort of post exercise position from a recovery standpoint. So if we stay with, I know it's in both products, but if we just stay with TRAIN at the moment, are there other reasons why you've included this amino acid?

Leighton: Yeah. There's two big drivers of it. The first is that with respect to, you've just called out, which is more around eccentric contractions and just very commonly create muscle damage tissue micro damage, glutamine and has been shown to effectively support that better. There's some other research we're actually doing on ketones, which we can talk more about. Also about exogenous ketones rolls on for the same reason, another discussion.

But the second big reason that we really focused on adding glutamine was all around this gut issue, glutamine is actually extremely well studied and respected in Orthodox medicine for invalid patients like long standing, invalid patients in hospitals, or chronic disease patients in hospitals that are going to be in hospital for a long time. And what happens is they have a lot of this gut breakdown, and they've just done so many studies now on showing what happens to the gut membrane with endurance sport and particularly high heat endurance sport, which typically is triathlon.

In terms of endotoxin moving across the gut barrier and into the blood. And glutamine is one of the first choices of treatment in Orthodox medicine for gut membrane breakdown. So then they started doing the studies of the role of glutamine in endurance sport to actually minimise heat triggered damage to the gut membrane. And you see even electron microscope photographs of this now showing how it can hold that membrane that much better. And this well may sound like why do you have to worry about all of that?

Well, if you're really looking for consistent training blocks and getting up the next day and repeating the load that you did the day before, if you want to really increase that consistency, looking at all of these factors that raise the overall load of inflammatory triggers is a really important factor. And certainly the feedback as people have shifted to our TRAIN products, we get a lot of feedback. And part of it is just the move to low carb, high fat, just a lot of feedback on just really rapid recovery, and the ability to up the load or the frequency of their training blocks as a function of that.

Steph: Yeah. Well that's the inflammation pace, isn't it? I mean I think that's what we forget as athletes. A lot of people get so focused on their training, and they actually forget when the recovery occurs and you can't try and if you don't recover, right? And you can't perform if you don't recover. So that's where we need to be focusing. So bottom line is what goes in your mouth. So certainly getting rid of the inflammatory foods that look like a food pyramid, that looked like conventional sports nutrition, or triathlon guidelines, but then there of course your fuelling product needs to compliment that. So yeah, glutamine for the gut. I love that you've mentioned that
because it's a really well-studied amino acid that we use clinically for conditions like leaky gut or intestine permeability and then like top level, it's going to help you absorb your nutrients better and that's what you need, right? Whether you're at rest or training or racing.

Leighton: Yeah. No, you're right. No, it's just amazing actually. We were kind of a little surprised just how much research there was on it, yet how little application that we're really putting into sports nutritional products.

Steph: Yeah. I guess it's just being sold from that post-workout point of view. So it's great. The other concept for me that comes to mind is certainly those athletes that don't quite get their fuelling right. What we don't want them to do is run that risk of becoming catabolic. So I wonder if you've got any thoughts on, because you've got collagen in there as well, which are that perfect combination of preventing the muscle breakdown that we sometimes see with extended fasted training.

Leighton: Yeah, we could easily point to the collagen and argue that point. I don't think it wasn't by design that we had it there and I would be probably dramatising if I were to say that the collagen amount that we have in the product is sufficient to achieve the result we're looking for. As a compound, absolutely you're spot on in terms of the use of collagen, glutamine, we believe exogenous ketones, and obviously whey protein isolates, these things certainly have a more anabolic restorative capability. I think though, how they're taken and the amount they're taken is really critical to getting the desired effects. So this is an area of product development that we're very close to finishing on and we'll talk about some more products coming out soon that talk to exactly point you bring up.

Steph: Yeah. Awesome. I appreciate the honesty. Obviously, as you said, you've used that collagen to bind the MCTs rather than using a starch which is commonly used. So obviously the dose is probably not exactly what we need for the reasons I would use collagen in someone's clinical prescription, but you've still got that glutamine to prevent any catabolic component. And then really accelerate recovery, which is incredible. We just haven't spoken about the immune piece. So I just wanted to give you the opportunity to share what you've learnt there from both a lifestyle. So what we've done or what you guys are promoting with the diet and then certainly with your products.

Leighton: I think it's well known both from athletes and then studies they've had on like groups of athletes who have completed these types of races we're talking about. And the finding is that, in that two to four week period after these races, it's very common to see upper-respiratory tract infections, higher than the same athletes in just their general training load. So something happens in racing and certainly I would say also in the heavier part of the season, where training loads are high, that immune response seems to be threatened. And we didn't initially when we were building products we weren't thinking about this. It's something that we've come to observe. And then as we observed it we wanted to understand what it was and where we've landed. And I'll be honest, it's not like we have ran a gold standard double blind placebo controlled study on this at all, but our observations and our science kind of analysis of this.
If you look at glucose and if you look at vitamin C, those two compounds are extremely similar from a molecular perspective point of view. They both compete for absorption into the cell, but glucose will always be prioritised and preferred. So in the situation of a classic, now I say American diocese, where glucose consumption is so high, it is preferably being brought into the cells and particular obviously as it relates to the immune system, white blood cells, etc. And the vitamin C is actually deficient at a cellular level because of just the over abundance of glucose. So converse to that is when we see athletes begin to shift across to a much lower carb regime that their ability to go through a season without the classic upper respiratory tract infections and particularly see this, there's two periods.

One period is that you're coming out of winter, you're getting into spring and you're jumping in the pool and you're starting the season off. And as you ramp your training at the start of the season, you're starting to also ramp your carbohydrates, classic food and dietetic approach. They start increasing the carbs. And then more often than not, it's a simple carb. And sure enough the upper spiritual tract infections begin.

And then at some of the big races, you absolutely find several weeks later you have this upper respiratory tract infection. So what we think is going on is that as you pull back on the carb and the vitamin C levels are getting back into the cells in a level that is functional in the spirit of the response of white blood cells to responses to immune threats, etc, whether that is antibacterial, anti viral capabilities. And even as I say, even just the pure speed of response of the white blood cells, we think is a function of they are just being fed the vitamin C that they fundamentally need to operate effectively. So this is less about a pitch on our products, but it's more about an observation of low carb, high fat lifestyle as it relates to endurance sport.

So, we don't think this needs like a supplement from - a pick a company. I'm not taking away from the fact that probably most athletes do require some type of ascorbic supplementation. But I'm just really just highlighting this association I think between very high glucose consumption and compromised vitamin C levels in immune cells.

Steph: Totally. It's complicated, right? There's lots of avenues. We know the sugar is going to be releasing the reactive oxygen species, which you briefly mentioned before. So it's that automatically we're in that pro-inflammatory state and athletes more than anyone. Although I still think everyone's goal should be anti-inflammatory because that's our long-term health that we're looking at performance side. Right? So I absolutely agree with you and hopefully when we move to an LCHF template or lifestyle, our focus is actually on plants and then natural vitamin C rich foods, which we actually don't find a lot in a food pyramid where grains are prioritised.

Leighton: You got it. Spot on. Anyway, that's just our point of view on it. I think there'll be more study on it, but that's kind of what we're seeing and observing.

Steph: Yeah, for sure. So interesting and definitely keen to see more research. Wanting to switch gears towards your RACE+ I love this product. So many areas to call out, but I'll hand it over to you first to share why you chose the carbohydrate that you did and we'll go from there.
Leighton: Yeah. So, firstly, just going back to what we said earlier, it's kind of sounds a little strange for a low carb, high fat nutrition company to then come out with a product that's got carbohydrate and well as we just said, this is not a product that we advise to use on a day to day basis in the spirit of an everyday drink like a Gatorade or what have you. Right. This is by design really aimed at high intensity training and racing and typically the high intensity training happens as you get closer to you A races of the season. So, and what we said earlier was that obviously if you have both systems of oxidation running in parallel without one effecting the other, why wouldn't you supply the inputs to both of those systems, on the fat it's easy.

You've got 40,000 calories on board, maybe some of us more than others, but typically speaking and then on the carbohydrate, like we said, you've probably got glycogen stores several thousand. So therefore in races over that two to three hour space, you're definitely going to need to... well I should say it this way, you don't have to add a carbohydrate, but as a function of that, you will definitely start slowing down if not stop. So if you're trying to achieve a result, you will need to provide both carbohydrate and fat as you get into those greater than three hour races. We looked at a whole lot of different forms of carbohydrate and there are companies that have been around before us, still are around like you UCAN etc, they have their proprietary product.

We were again, focused on gut first and making sure that the carbohydrate source moved through the gut from a structural perspective like a complex carbohydrate. So what we mean by that, we shied away from simple sugars in that we know what they were doing to the gut. The research showed the issues they were creating in the middle of races. Forget about inflammation that's another subject on that. But just what they were doing in the race itself.

So we shied away from using glucose, fructose, sucrose, and we shied away from, in fact, we don't use any sugar alcohols across any of the products. We landed on this branched chain cyclic dextrin, which is a basically an enzyme treated starch, a complex carbohydrate that's coming out of corn or amylpectin. And the reason why is that it has a very interesting characteristic on its molarity and it comes through the gut very fast and by the gut I'm talking about the stomach, it comes through the stomach very fast.

This is important to avoid the whole feeling of nauseousness which you commonly get around a lot of those simple sugars because the nature of the characteristics of them is that it has to sit in that stomach for quite some time before it gets into the small intestine. So we've chosen that. And then as I said, it has its characteristic though when it gets to the small intestine for absorption is much more like a standard starch.

And that is that it doesn't just dump it all into the blood at once, but it actually has a more bell curve absorption into the circulation. So we've selected that. We continue with glutamine, we continue with the sodium and potassium. The only other component that we add to this is a magnesium di-glycinate. And I'm sure in your clinical practice you'd be well aware that there's many forms of magnesium.

Many of them actually create gut problems. In fact, when I was in clinical medicine and naturopathic medicine, there was forms of magnesium you would use with the
purpose of being a laxative. Whereas the di-glycinate or the glycinate form, you can actually dose quite high. And actually again, in clinical practice, the reason why you’d use that form is because you can dose thigh without gut problems and have a clinical response to that. So we’ve added that by the sheer nature of, again, a lot of research just shows what happens to your magnesium stores in a lot of high intensity training and racing and they typically get depleted. So let me stop there. But that’s the kind of spirit of what we created and what’s in there and why it’s in there.

Steph: Yeah. Awesome. I mean, I said there’s so much I love about it. I think the starch component is going to make a huge difference. Again, no blood sugar spikes, but of course yep really eliminating that GI distress that’s so avoidable. And then kudos for using Monk fruit extract. I’ve not seen it before in an endurance drink or sports fuel. It’s even rarely used certainly in many keto or low carb products at this stage. And I’m a massive fan of it because we’ve got to move away from those sugar alcohols and even for some people like Stevia, just isn’t well tolerated or it’s too sweet. Another issue from a blood sugar point of view, calories aside. So yeah, really happy to see the use of Monk fruit extract. Is anyone else doing it or have you guys gotten a full front?

Leighton: I’m sure it’s out there. The problem with a lot of the Stevia is that people think they using Stevia only to really read the fine print. It’s a Stevia or a sugar alcohol mix. And there’s, at least in the US there’s a stigma around this now. So on one hand we think that the taste profile of Monk fruit is far better than Stevia. But secondly we want to stay clear of this kind of stigma that’s in the market now of you see these packets of Stevia being sold in supermarkets and nine out of 10 of them are a little bit of Stevia and a bunch of Erythritol or other forms of sugar alcohols. And it’s just it feels like false advertising. So we just steered clear of all of that.

Steph: I mean, it’s the same with some Monk fruit products now unfortunately, if you don’t read the fine line like the print, you’re buying Erythritol with a drop of Monk fruit. So again, you’ve got to turn the packet over and read the label in that context. All right. Just a couple of things like circling back to where we were before you certainly gave us some context around the race, how that first hour you really want to keep your fat oxidation going. So of course you wouldn’t be adding carbs in at that point in time and I absolutely agree with you there, and then beyond an hour is where we’re starting to look at incorporating RACE+. So I know you can’t answer the question because you don’t know someone’s substrate oxidation, but could you just give us a general recommendation for how we’d fuel a half marathon? Say if it took us anywhere between two and three hours.

Leighton: Yeah the foundation advice would be exactly what you just said, that first hour and then the hours thereafter. To be honest, I think a lot of it for a half marathon and we just actually had a show, we were at the expo at the Miami marathon and as marathon as a participatory sport moved to offering on the same race day marathons and half marathons, it’s attracted a whole new breed of athletes where I’m not sure that nutrition is high on the agenda and maybe even training isn’t high on the agenda so you can fake and get through a half marathon without a lot of support. But if you’re starting to get into the three hour or the two hour, the one and a half hour and quicker, you do have to start thinking about some of these things.
I do think good fat oxidation efficiency probably starts at a gram a minute, and the best is somewhere probably between one, three and one four. And this is actually some debate as you get into one five and above whether you actually begin to have some carbohydrate inefficiencies. But at one two, one three or even at one gram a minute you're now talking 700 calories an hour. You've already got 2000 on board if you have to, if you're burning 700. So you've got two to three hours on board. So I think it really comes down to just having good clarity through your training on what your duration is going to be and obviously the course profile, the heat of the day, all of these things are factors. But if it's likely that you going to be in that two to three hour space, you're probably going to have to take something like a RACE+ or equivalent

Steph:  And then the number of serves per hour. How do you advise on that? Because obviously they're not that high in carbohydrate from, if we look at a standard product, I've forgotten, is it 15 grams per serve?

Leighton: Yeah. We get a lot of questions over this. And actually it's funny, we actually had a customer early on where they looked at the whole bag of the product. They said when I buy whatever the other product they were buying. They said, "how come the other product is like twice the physical size as yours." I said, well, this is the point that fat has nine calories per gram, right? You don't have to carry as much on your race. And the penny dropped. Anyway, coming back to your question, look, again, it's relative to a person's oxidation efficiency, but in the Quickstart guide, and again we'll give you the link to that and folks can download it, but we talk between one and one to two RACE+ sachets an hour and that covers a fairly broad range of fat oxidation efficiency. If an athlete feels they have to take more than that, you probably want to start double-clicking on what are they really doing in training to switch on the fat oxidation.

Because by math they shouldn't need it. Now I would say this is true for races like up to IRONMAN. I really debate this for multi-day ultras because there's a lot of other factors that are switching on for a multi-day, ultra, particularly central governor and lack of sleep and a whole bunch of these things that are of course challenges. So anyway, one to two sachets per hour and when you're in that second and third or fourth fifth, depending on the nature of the race, hour of the race.

Steph:  So I totally agree with you, but as you can imagine, what 30 grams of carbs an hour is to someone who's been doing 90, because that would be the recommendation if they've been doing one gram per kilogram body weight, which is what we see flown around everywhere. That's 85 or 90 grams of carbs per hour for a lot of our male athletes at least. And so dropping them down to 30 is hard to wrap their head around let's just say.

Leighton:  Well, Dave Scott does a good job on this. He kind of says that low carb, high fat doesn't start on race day and you really got to be building this and I'm sure you've had other podcasts talking about it takes some time to get these systems switched on. So the numbers I'm giving is for an athlete that has been compliant to switching on their efficiency of fat oxidation and there is a very real cost to getting the substrate testing done, but I think it's really important just to understand what that is and how you're improving in that area.
Steph: Yeah, totally agree. Especially because as you would know, a lot of athletes in this space are using the Maff formula. Love from Phil Maffetone a good friend of mine, I think the one 80 minus your age can be a great place to start. But as someone who’s done a lot of the testing, the substrate utilisation testing, I see way too many variations by 20 or 30 beats per minute, and that means that what you’re doing with your training is way off. So personal data is king.

Leighton: Actually. I know Dan, Dan is running, Dan Plews on his Endure IQ program. They have some online calculators. So there’s a gradient between, ultimately what you’d love to do is go and get the full test done and then doing some math and then there are these calculators in the middle that I think help provide maybe a little bit more clarity. It’s probably worth taking a look at some of those. Maybe get Dan on the show sometime.

Steph: Yes, I must do that. Thank you so much. So I just want to give you this space to sort of add anything else that you’d like to share or just simply direct myself and the listeners today as to where we can find out more.

Leighton: I think we covered a fair bit, right? We did touch on the gut area well, one area that Dan gets a lot of questions about with his Kona race is, “Hey, you talk about 50 grams an hour. Why that?” And his point was that as you get into 50 and 60, you begin to get very high risk of gut distress issues, they’ll shut down your race. And the reason he brings that out is that a lot of athletes translate fatigue in the post four hour segment of any of these races. Meaning it can be from the fifth hour to the 12th hour or what have you. They translate that fatigue as a lack of fuel and that is not the problem, but they keep pouring in the fuel and next thing you know, they’ve shutdown their race. So I would just kind of put a period on this kind of gut comment around that is if you feel that you need to start getting close to those numbers, you’re probably not oxidising your fats well enough yet.

Steph: Yeah, I love that point. So again, going back to the foundations and taking the time, like taking the time to become at least a better fat oxidiser, knowing that the journey can be two years or longer to get it really right, to dial right in.

Leighton: Sure. Yeah. Well, thanks for having us on and yeah, I mean we’ve got a bunch of content out there at sfuelsgolonger.com and we’ll give you a bunch of links that have our video content, and some of the Quickstart guides and folks and your listeners can download when they want.

Steph: Thank you so much. I really appreciate time and your wealth of knowledge. Thanks again.

Leighton: Great to be on. Thanks again. Steph.