The Connection Between Insulin Resistance and the High-Carb, Low-Fat Diet:
A Special Interview With Dr. Tim Noakes
By Dr. Joseph Mercola

JM: Dr. Joseph Mercola
TN: Dr. Tim Noakes

JM: Hi, this is Dr. Mercola, helping you take control of your health. You are in for a real treat today. We are honored and privileged to have with us Dr. Tim Noakes from South Africa. He is a well-respected scientist, researcher and physician. He’s a really great athlete. He’s actually a professor at the Division of Exercise Science and Sports Medicine at the University of Cape Town, South Africa.

He has started a revolution of low-carb diet. But actually, after completely making a turnaround and promoting high-carb diets because he was a long distance endurance athlete and ran 70 marathons. He has quite a bit of history and stories to tell us, especially an update on his trial that he is engaged in in South Africa that they’re seeking to take away his medical license for simply telling the truth. Welcome and thank you for joining us today.

TN: Thank you, Dr. Mercola. It’s a great privilege to be on your show. I really appreciate it. I look forward to getting to you and educating or hoping to give information that you’ll find of interest.

JM: Now, many people who have studied the low-carb approach invariably have come across your information because you’ve written a number of books on this. You really are a pioneer and a leader in this field. But there are a number of people who haven’t yet been exposed to your work. For those individuals, I’m wondering if you would care to describe your transition. As I’ve mentioned earlier, you’re a long distance endurance runner. We both share that passion. I didn’t run 70 marathons, but I ran one.

TN: Good.

JM: As a really competitive endurance athlete, you focused on optimizing. As a physician, you had your own – actually, did you know Dr. George Sheehan, too?

TN: He was my great messiah. I just loved him. We were very, very close. In fact, I wrote the introduction to one of his books.

JM: I thought you might have.

TN: Yeah. In fact, I stole so many of his ideas that I feel a bit guilty about it. But he was just the most wonderful, wonderful writer and person.

JM: The only race I ever won in my life was a race that he was in.
TN: Fantastic.

JM: I remember that. Why don’t you share your journey with us because it’s very intriguing?

TN: I graduated from medical school in 1974. I did my internship at a hospital in 1975. I realized that I really wasn’t cut out to be a medical practitioner. I was much more interested in science. At the time, I was running. It was exactly the time that the high carbohydrate diet came into running and also into health. I was working at a cardiology unit and my professor said, “You must eat a high carbohydrate diet.” Because those were the new dietary guidelines and he was the guru. Of course I changed.

I changed into a high carbohydrate diet and started promoting that in my writings. I wrote a book, *Lore of Running*, which is widely read. There it says that you must eat lots of carbohydrates for both health and performance. I continued to do this for 33 years until 2010.

In 2010, one morning, I just finished writing my book *Waterlogged: The Serious Problem of Overhydration in Endurance Sports*, in which there’d been 30-odyssey researching and discovering how industry influences science, how industry had influenced the drinking guidelines for athletes. I was really angry because people had been hurt as a result.

Anyway, I wrote the book and sent it off. The next morning, I got up and went out for a run and had the worst run of my life, I think. I decided something had to be done, but I was overweight. By chance, that very day, an advert came for Dr. Eric C. Westman’s book, *The New Atkins for a New You: The Ultimate Diet for Shedding Weight and Feeling Great*. By chance, I opened the email and they were saying that you could lose 6 kilograms in six weeks, which of course I didn’t believe because I’ve tried all diets and none of the diets worked.

Anyway, I decided I would go and buy the book, which I did. Within two hours, I said, “Oh my gosh. I got it wrong for 33 years.” I decided then and there that I was going to go low-carbs. I started at lunchtime on that day. I’ve been on that diet now for the last six years. I’ve dropped 20 kilograms in weight. My running returned to what it had been 20 years earlier.

I subsequently discovered that I have type 2 diabetes because of a long family history and all these carbohydrates. But I’m glad to say today all my blood tests are within the normal range. I am taking medication. But the point being is that in six years with diagnosed diabetes, I have not worsened. In fact, I’m probably slightly better than I was six years ago, which is completely the contrary to what would happen if you followed the conventional advice.

Anyway, I decided that I’d start reading. I read all your work. I read all the books. I started doing research. That convinced me that this is a really important change that we need to promote throughout the world. Clearly, the diabetes and obesity epidemic started in 1977. It’s caused by the dietary guidelines. I slowly began to understand our industry has driven the bad guidelines and I’ve been promoting it.

I think the next key point was that in 2013, we published this book called *The Real Meal Revolution: Changing the World, One Meal at a Time*. We used the word “revolution” because of
Atkins’ book. He’d used the word revolution. The book just went viral in this country. It sold an enormous number. It’s one of the biggest selling books ever in the history of Southern African literature.

**JM:** Congratulations.

**TN:** It just turned everyone. Also the Africans now know about the low-carbohydrate diet. Of course the majority perhaps that don’t like the idea, but a minority do and have adopted it. It really produced major changes in dietary understanding in Southern Africa. As a consequence of the success – I think you’re going to lead into it – that I had a legal action against me from the Health Professions Council of South Africa, which is a professional board. They were questioning whether I should be allowed to continue practicing as a medical doctor.

**JM:** Yes, indeed. First of all, congratulations on your open-mindedness and your willingness to challenge your long-held, cherished belief, in fact, ones that you had actually gone public with and in print. It takes quite an individual to reverse their position. You’re a rare breed and I really applaud you for having the courage of your convictions and open-mindedness to change. Not many people can do that, especially almost everyone in conventional medicine.

**TN:** Thank you. It was really interesting because once I saw the truth, I realized that I had hurt people or my advice would hurt people as it has certainly hurt me. I just couldn’t live with that. Quite right. I just don’t understand why people don’t admit when they’ve made an error. Let’s move on. It’s very, very frustrating in the profession. It is so obvious what has gone wrong with the profession. It’s so obvious what we need to do, but we can’t do it for a number of reasons, which of course you will also understand.

**JM:** Absolutely. I’m glad you were elevated above that resistance to change. Let’s get back to the legal action that was directed towards you. As I understand, it was a result of a tweet that you made on Twitter about advice to a pregnant woman on low carbohydrates. The president of an organization, the Association for Dietetics in South Africa, wrote a long letter to your profession’s licensing committee that challenged your ability to practice medicine.

It’s superficially, from a 50,000-foot view, it seems that South Africa is like two or three decades behind the science. Not you obviously, but the conventional medical thinking down there. They really are seriously challenged in their understanding of current physiology and performance.

**TN:** It is so bad that my own university dissociated itself from me. At my hospital, Groote Schuur Hospital, you are not allowed to prescribe a low-carbohydrate diet for any condition. You’re not allowed to discuss the diet amongst the doctors. If you do practice it or if you were to prescribe it, something would happen to you. That’s how strong the movement against it is. It’s absolutely astonishing.

The worst bit for me actually wasn’t the trial and being accused of malpractice and so on. The worst bit was my university. The dean of medicine, wrote to the local newspaper and said that they dissociated themselves from my views and all those who support the low-carbohydrate diet. Of
course they had no evidence for it, but here I’d worked at this university for 35 years or so, and was one of the better known scientists. That they could do that was absolutely astonishing.

But I think we’re beginning to realize that it was [inaudible 09:51] which was built-up over three or four years. It does seem that industry was strongly involved. That has been one of the outcomes that I think will be really interesting.

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I was incredibly privileged to be able to present five and a half days of testimony about this diet. What we were able to do was to take the focus away from me and my malpractice and put it onto the dietary guidelines. I presented five and a half days. I was cross-examined for three and a half days. Then for another three days, we had Nina Teicholz from New York, Zoe Harcombe from Cardiff, and Caryn Zinn from Oakland. They were the three expert witnesses. They were absolutely astonishing.

For example, when Nina – of course everyone knows she wrote the book *The Big Fat Surprise: Why Butter, Meat and Cheese Belong in a Healthy Diet* – when she finished, the lawyer for the prosecution could not cross-examine her. He just threw up his hands and quit. He didn’t have anything to say. Zoe Harcombe was the same. She has just completed her PhD showing that there was never any diet evidence to change the dietary guidelines in 1977. She presented her PhD thesis. Again, the evidence is absolutely overwhelming.

The end result is that we’ve had 23 days in court so far, and we won every single moment for 23 days. We won everything. They have not been able to pin one thing on me. I think it’s the first time in history that a diet has been put before a legal jury to decide whether or not it’s true. You know, my one legal adviser, Dr. Rocky Ramdass. I asked him. He’s a medical doctor and a lawyer. I said, “Rocky, what’s the difference between medicine and law?” He said “Medicine is ‘it could be,’ ‘it might be,’ ‘it may be.’” But he said, “Law, ‘it is.’” That’s the difference.

That’s what I’m so excited about because I believe, in April, when the final decision is made, they will say I’m not guilty and the diet is wrong. If that happens, the health professional council, which is a state party, which took action against me, is also responsible for all the nutrition and dietetics teaching in South Africa. They’ve got a problem that the committee they set up to examine me came back with the decision that the dietary guidelines are wrong and they have to change them. That could be a huge moment for South Africa and perhaps for the rest of the world.

**JM:** That is terrific. Thank you for that update. I was aware that Nina and Zoe were testifying for you. I’m glad to hear that they testified well. I invited both of them to participate in editing my book, *Fat for Fuel*, which comes out this year. They had to decline because they were preparing and testifying for you. That was a bigger mission and I’m glad they were able to testify for that.

I’ve interviewed both of them on our website before. I’m wondering if you could delve into some of the evidence that you acquired regarding the industry backing the anti-low carb approach, because I’m sure some of that came up in the trial.
**TN:** What was really interesting was that the two lawyers, Rocky and my friend Ernest, both gave their time to me for free. They saved me millions of rands, literally millions of rands.

**JM:** What is a million rand compared to U.S. dollars?

**TN:** It’s about 14 to 1. Fourteen rand to one dollar.

**JM:** Okay. Still a lot of money.

**TN:** There were hundreds of thousands of dollars that they saved me, because they said there’s something behind it. We don’t like it. During the cross-examination of Dr. Vorster, who is the lady who drew up the South African dietary guidelines, Rocky asked her, “So, Doctor. In 2002, you drew up the South African dietary guidelines. You did it again in 2012. They’re essentially the same. Nothing changed in 10 years. But during that period, obesity and diabetes took off. Why didn’t you change them?” She couldn’t answer him.

The issue of sugar was that sugar was written out almost completely out of the 2012 dietary guidelines. Whereas in 2002, there were some comments that we should restrict sugar. As I understand, by 2012 it had gone out or was much less prominent. This was the case against me was that I was telling mothers to wean their children onto a higher fat diet. They’d also removed a statement that children should be weaned on to a higher fat diet, which incidentally are the dietary guidelines of South Africa.

The question was why had the sugar become downplayed in 2012? We put that on the record but we had no reason to explain why it was.

The CrossFit Organization in the United States has had some trouble with the American College of Sports Medicine as I did, because I exposed them for over-promoting drinking. The influence appeared to be Pepsi, Cola and Gatorade influencing the drinking guidelines of the American College of Sports Medicine.

The head of Crossfit decided to come to South Africa and meet me, Greg Glassman. We had a long chat and we presented a symposium. After chatting to me, he said, “Listen, I want to send out my best suit of journalists to meet you,” which he did. A week later, just before Christmas last year, Russ Greene came out and we sat together for about 10 hours. He went through all the transcripts of the trial. He also then went on the internet and started doing some investigative journalism.

He identified that all the expert witnesses in the trial against me are linked to an organization called the International Life Sciences Institute, the ILSI, International Life Sciences Institute. He suddenly said, “Oh my gosh,” because that is a Coca-Cola funded industry or organization, which has links.

**JM:** A front.
TN: That’s exactly what it is. Plus, it’s got links to Monsanto, Pfizer, Unilever and, in the past, the tobacco industry. He wrote those incredible exposé on his website. Russell Greene is his name. If you go to Russell Greene, you’ll find what he’s written. It’s an amazing exposé, which suggests that there was a coordinated effort in South Africa to bring me to book and that it was driven by industry. The reason was we were getting too close to questioning the role of sugar and carbohydrates in ill health. We haven’t proved it, but there’s enough evidence out there to suggest that there were things behind the trial that one would not have thought about.

JM: Terrific. Thank you for sharing that. I’ve noticed since our discussion that you have a characteristic of many great people that I’ve come to know and that you’re very humble. That can just be reflected by your last statement because you had suggested that you had played a part in the understanding that overhydration is an issue. Not only did you play a part, you played a major role, probably the most significant role of any professional on the planet. That’s sort of off tangent to the low-carb issue, but nevertheless an important one.

I’m wondering if you could discuss that story about how hyponatremia or drinking too much contributes to so many unnecessary deaths. As a result of this massive campaign from Pepsi and Gatorade, for everyone to just drink, drink, drink.

TN: Yeah. Correct. When I started running marathons in the 1970s, we didn’t drink during races. In fact, I ran a 56-mile race and I think I had four drinks. You’d have a drink every hour and you would literally swirl your mouth out with water and that would be about it. No one came to any harm.

Then in 1981, we decided that we would promote drinking. I became very active in South Africa saying there was not enough fluid available to marathon runners. We started to change it. By 1981, the race in which I drank four times, in this race of 56 miles, they then had a drinking station every mile. They had 56 drinking stations in a 56-mile race. At the end of that race, a lady was unconscious. She was hospitalized and about a month later, she wrote to me and said, “Doc, what happened?” Her blood sodium concentration had fallen. She wanted to know what had happened. She said, “Maybe I took too little sugar or salt during the race. What should I do about it?” I said, “I have no idea.”

I then decided to investigate. Over the next 10 years, we were able to show that what had happened was she had overdrunk fluids. She’d retained the fluids that had caused her brain to swell that have caused her to go unconscious. She’d remain unconscious for four days. We provided definitive evidence that it was overdrinking that caused the problem.

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At that time, I warned that an American is going to die during a marathon. It happened in 1993 for the first time. Exactly what I predicted happened. This got worse. A lot of other athletes died, particularly during marathon races, which was completely unnecessary because we knew what was causing it and we knew how to prevent it.
What had happened in the meantime was the American College of Sports Medicine, funded by Gatorade, produced new drinking guidelines in 1996. They said that when you exercise, dehydration is a killer, which it is not, and that you must drink as much as tolerable during exercise.

In 2002, a young lady ran the Boston marathon and she did exactly that. She died shortly after the race from this water intoxication. That was then reported in the Boston Globe and the New York Times. Suddenly, it became front page news.

Ultimately in 2007, the American College of Sports Medicine revised their guidelines to be exactly what I said that it should be: that you should drink to thirst. The tragedy was that, we know of probably 12 to 14 deaths. We know last year there were still two deaths in America, American football players who overdrank and died as a consequence. We estimate about 3,000 people were hospitalized with the condition, but fortunately they didn’t die. This is entirely doctor-induced or induced by the guidelines that were being preferred at that time. That frustrated me because it was entirely predictable.

It took a lot of time to change. The only reason we could change was because two scientific journals in the entire world were independent of these sports drink industry. By that, I mean how industry works is it makes sure that its key opinion leaders who had funds to do research also happen to be the people who drew up the guidelines, whether they be dietary, cholesterol or drinking, in addition that they are the main reviewers of the journal articles.

Over a 10-year period, we would publish, we would submit papers and I knew that they went to exactly the same reviewers every time. It didn’t matter which journal you sent them to, they would go to the same reviewers because we’d get the same inane comments. But there were two journals which were independent, the British Journal of Medicine and the Canadian Journal of Sports Medicine. They published our work. I always knew that iff there were two journals open to our papers, our science, we would win in the end. In the end, we did win.

But if those two journals had also been controlled, if that had the same editorial boards, we wouldn’t have ever done it. That was how I learned that is how industry controls information. They actively do it. They actively support people to make sure that only guidelines that benefit industry are ever published.

**JM:** Yes, indeed. We published articles on that before, describing that whole sequence. But it’s great to hear your anecdotal testimonial as to that exact process. Because it’s a very clever and sophisticated mechanism that they developed over decades, maybe even longer, to control the information. Not only to the public, but to the professionals, the conduits, and these people responsible for making and endorsing these guidelines report to these committees and they fund them heavily. It’s a massive conflict of interest, but it’s never identified.

One of the new transparency obfuscations is to not directly fund the researchers themselves, but they fund a non-profit to the university that they work for and then the university is not required to report funding the research. They’ve got all these clever loopholes to look like they’re not biased, but in fact, nothing could be further from the truth. It’s great that there are our future [inaudible 24:23] out there. The message got out and people’s lives weren’t damaged. I’m
wondering if you could comment. Obviously that’s an extreme where people are doing these endurance races. Your conclusion was that people should drink to thirst.

**TN:** That’s correct. Yes.

**JM:** I’m wondering if you could translate to the more common person just watching this who’s not participating in endurance events, most of them, and just trying to drink the right amount of water. Do the same guidelines apply or do they try to do some other parameters? Look at their urine until it’s clear or light yellow? Eight glasses of water? There are a lot of different recommendations. Since you’re one of the world’s experts on this, what’s your conclusion?

**TN:** My conclusion is that humans evolve over millions of years, like all creatures. We don’t tell our cats and our dogs what to drink. They respond to their own biology. We’re exactly the same. The fact that we have a slightly bigger brain doesn’t mean to say [we’re different]. We just need to respond to what our body tells us. What did people do hundreds of years ago before we had any of the science? That’s the key. It comes down to biology. I always think that if you’re eating and drinking according to human biology, then you’re doing it right. The key is just listen to your biology.

You can’t check from your urine. We know, for example, that people who have died from this condition pass a very dark urine. The whole point is that they retain the water because of a specific abnormality. If you tell them to look at their urine, they would say, “But it’s dark, therefore I must drink more.” But in fact, they were retaining the water and they were overhydrated, not dehydrated. The color of your urine doesn’t really tell you whether you need to drink. It’s just your thirst that really tells you when you should be drinking and when not.

**JM:** Thank you for that important clarification and really solidifying what should be common sense. 21st century common sense is not so common, tragically, with sometimes unnecessary pain and suffering as a result. I suspect people aren’t going to be dying who aren’t participating in endurance events from not applying this, but they’re certainly going to not be able to optimize their health, biology and physiology as a result of applying artificially constructed approach to drinking.

Let’s get back to low-carb because I’m really interested in your insights on that because you’re really a leader in this area. I’m wondering if you could tell us how long you’ve been doing this and what your particular diet looks like, and what your experience tells you seems to direct you to an optimal approach, integrating the low-carb approach.

**TN:** I started six years ago. My body responded in such an incredible way. I can give you an example. I was running at that time but I haven’t been running much. One day, after about five weeks, I was doing a run that I’ve been doing for 40 years and I’d got slower and slower and slower. I was so slow that I really didn’t enjoy it. After about five weeks on the diet, coming down the run, firstly, I was already 20 minutes faster, in fact, probably 30 minutes faster than I had been.

**JM:** How long did you run?
TN: It was about two hours. I just started sprinting and I couldn’t believe it that I’ve been really struggling to run. All of a sudden, I had this complete change. I realized then that what I love about running is running a bit faster. That’s probably what kept me going.

Anyway, I suddenly started running so much better that I couldn’t believe it. In time, I discovered that I had type 2 diabetes. You’ll ask, “Well why didn’t you know?” The answer was because I was measuring my cholesterol. I was measuring fasting glucose, but I wasn’t worried that it was 5.6 or 5.7. I just ignored it. Then suddenly it went to 6.8 and I realized that something had changed.

Then I discovered I had type 2 diabetes. With the treatment – I do take some medication. With the diets, I’ve got normal blood values now or that I’m taking medication. You have to remember that I’ve been diabetic for at least six years. Now the conventional six years at my age, I’m now 67, I should be 20 kilograms heavier and injecting insulin. I’m not. I’m looking pretty good. That to me is the best proof I have that this diet has been incredibly helpful for me. I’ve not gotten iller in the last six years and that I’m managing the diabetes extremely well. That’s my one point too, because I just feel so good. I’ve got so much energy.

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That’s the first thing. The second thing I’ve learned is – I do intermittent fasting. I only eat between lunchtime and evening meal at about eight. I fast the rest of the time. I only start eating at 1 o’clock the next day and stop eating at about eight. I found that that’s been really helpful. It’s about a 16-hour fast and an eight-hour period where I would eat.

JM: Okay.

TN: Helpful as well.

JM: Terrific. Just curious on what drug you’re taking, probably an oral hypoglycemic or metformin.

TN: That’s right. I take metformin. Yeah. I take berberine as well, and maybe other things.

JM: Berberine seems to have almost the same benefits and actually the same mechanism of action as metformin, which I’m opposed to taking. A lot of people take it who don’t have diabetes, just for the longevity aspects. I think that’s a mistake. But I’m glad you’re taking berberine. What does are you taking? Like 500 milligrams a few times a day?

TN: Twice a day. I take about 500 milligrams twice a day at least, sometimes one and a half grams.

JM: The issue of berberine is it’s not well absorbed. It’s somewhat like curcumin. Actually it is very, very bitter. You probably swallow the pill.

TN: I do.

JM: But if you’ve ever had the powder. It’s just extraordinary. Because you could easily solve that problem by whipping it up in a blender with some phospholipids, essentially forming a
liposome, then you can radically increase the absorption. But that’s a project we’re working on now, how to put it in a capsule.

TN: That’s great.

JM: Berberine is awesome.

TN: Yeah. I find that when I don’t take it, my average daily glucose is probably 0.2, 0.3, 0.4 millimoles higher. We use millimoles not grams.

JM: What would be the equivalent of 90 milligrams per deciliter in millimoles?

TN: That would be about five. It’s about five. It’s just over five.

JM: Okay. Alright.

TN: In fact, it’s exactly five. It’s exactly five.

JM: Perfect. Five is 90, and 90 is about the threshold. That’s where you really want to be under unless you just had a big meal. I also want to comment on your observation that many people in South Africa with type 2 diabetes, not 1, type 2 diabetes are placed on insulin. That is probably one of the worst mistakes, certainly on par with prescribing statins for almost everyone with heart disease. It just absolutely flies in the face of logic. It is not an insulin deficiency issue. It’s an insulin resistance issue. You just make it worse and you accelerate premature death by giving it the type 2 diabetic insulin.

TN: Exactly. Precisely. One of my great friends in California, who is a low-carb man himself, was very kind to give us a lot of money to research reversal of type 2 diabetes in South Africans. We started the research and what we’ve noticed immediately is that people who claim that they’ve reversed their type 2 diabetes on the start, the first thing they do is they stop taking insulin and no longer need the insulin. It seems to me that provided you remove the carbohydrates, you don’t need the insulin. If you’re a type 2 diabetic, you can manage it on ordinary medications. It doesn’t make sense to me to be using insulin if you’re a type 2 diabetic. The first thing you must do is change your diet and then cut the carbohydrates. Then you won’t need the insulin. You may still need the other medications, but you won’t need the insulin. Because we know that as you’ve indicated, insulin is highly toxic when it’s used in the high doses that we need for the treatment of type 2 diabetes.

JM: Sure. I’m curious. This new research that you’re doing on diabetes, are you still affiliated with the university or [not] because they disavowed you because of your adherence to the low-carb approach? Are you still a professor there?

TN: Yes. I’m an emeritus professor. I fortunately retired two years ago, just at the height of this action against me. It would have been very difficult for me actually to defend myself if I’ve been fully employed. That was one of the problems my health professions council didn’t realize. They
gave me time. That was what killed them because I could sit down and prepare all this material and think about it. Of course over the last two years, a lot of things have changed. We’ve got lots more information.

When you go to a university with a lot of money, they suddenly don’t mind having you associated with them again. I’m really excited because the research we’re doing is we’re looking at the whole body and how we define insulin resistance is often very simple. But we’re looking at every organ in the body that we believe has been influenced by type 2 diabetes. We’re seeing how they differ in people who reversed their type 2 diabetes on this diet, versus those who continue to be treated with standard therapy, including insulin. Seeing the biology, I’m really, really excited. We had a big meeting today. It’s not been done anywhere else in the world. It’s just the most exciting work I can think of.

**JM:** We look forward to the results of your investigation. I wanted to state that although I’ve promoted low-carbohydrates and I wrote a book 12 years ago now, actually 13 years ago, *The No-Grain Diet*, I understood its influence on insulin. But what I didn’t really fully comprehend until much more recently – the comprehension was catalyzed by my affiliation with Dr. Ron Rosedale and reading Travis Christofferson’s book, *Tripping Over the Truth* – that there’s another level, aside from insulin resistance that really needs to be done. That is having the ability to burn fat as your primary fuel.

I only made that transition within the last year, primarily as a result of adopting the low-carbohydrate diet. But in my experience, after about six months, like most things, I do too extreme. I went too low and I actually started having some complications. My insulin level was too low. I actually had a paradoxical rise in my blood sugar, which was a result of too low in insulin level when the primary function of insulin is not to drive sugar into the cell, but to suppress the production of glucose by the liver, hepatic gluconeogenesis.

Paradoxically, when I would eat some fruit or something, my blood sugar would actually lower. The insulin was stimulated. That started me exploring this whole process. What I conclude in I think is maybe the wisest approach, I’m really curious to hear your response to this because a long-term ketogenic approach is probably not the wisest strategy, but it’s probably an integration of a hybrid method where you actually have this cycling, where you go through a one day a week fast and maybe two days a week you’re feasting. I mean literally 100 or 200 grams of carbs. And then integrating intermittent fasting in there. I’m wondering what your thoughts are on that approach and what you’re experience has been.

**TN:** My experience is only that I started intermittent fasting in the last year or so. It’s still very early days for me to know what would be the basic control for myself. Again, I’m only looking at myself. However, we are leading up to clinical trials where we will start looking at patients with type 2 diabetes and introducing them to the low-carb diet and start looking at all these variants. But I think it’s too early for me. I don’t know yet how to give you any specific answers. But I agree. We begin with anecdotes. The anecdote you told us is very important. We have to explain it and understand it and use it to develop our ideas.
**JM:** There’s this segment of our culture with our bodybuilders who’ve actually known this for some time. They go through these methods of low-carb cycling to improve their body performance, or their body appearance, rather. It seems to work quite effective for them. I think they really taught us something in that respect. It’s just of course, obviously, this is integrating the whole principles of high quality foods, organic non-GMOs and lots of vegetables and all those. But I think this – what I call it is “feast-famine cycling.”

I personally fast one full day a week now. It’s not really a day. I stop eating at lunch about 3:30 pm and I don’t eat again until that following day at 3:30 pm. It’s relatively painless and I think your body loves that variety. I firmly believe that that’s what we’re tuned for, variety. If you do the same thing all the time, even if it’s good initially, you’re going to have problems in the long run.

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**TN:** That’s a really interesting point because when homeostasis fails, it loses its ability to change. We know that, for example, in running, the best runners have a weight variation. Each step is not the same. They’re very different. Athletes that have the biggest variation are the ones who are healthiest. They don’t fatigue. Once you get fatigued, you lose the variation. I tend to agree with you that in general principles, yes, that is correct. You have to have wide variation to be healthy.

**JM:** Sure. One of the best parameters to measure performance and recovering is heart rate variability, the ability of your heart for its individual beat to vary overtime. That’s easily measured.

**TN:** Exactly. Someone tweeted the other day that story that they combine low-carb diets and marathon training in working out how much they should do on the basis of that variation, heart rate variability. Their performance just went up dramatically in terms of knowing when you should train and when you should rest.

**JM:** That is the key for competitive, committed, over-dedicated athletes. It’s not hard for them to push them to an extreme. The key is to know when to recover. That’s what heart rate variability helps you to understand in a pretty precise way.

**TN:** Yes. Precisely.

**JM:** I’m just curious. You’ve done 70 long distance events, marathons, ultra or longer. Is it just because of a passion or some attempt to live long, or were you really competitive? What was the driving motivation behind it?

**TN:** That’s a great question. I think it was addiction. You know what I was addicted to? I think it was because I was profoundly insulin resistant. I went back and looked at some of my own data on an experiment that we did on myself when I was 28. That’s 40 years ago. We published it in the Journal of Physiology. I had a fasting insulin that was four times normal in those experiments. I was 28 running 140 kilometers, running 90 miles a week, in some weeks, up to 100 miles a week. I was lean and I had profound insulin resistance. Of course I didn’t understand this. We looked at the insulin values. They have been elevated. That’s because you’re eating a high-carb diet. It’s normal. But it normalized and we did a low-carb diet for three days.
That was the trial. It was a three-day carb restriction. My glucose normalized and my insulin normalized, but we didn’t understand what it meant. I was insulin resistant and I used to find that when I’ve been running for four hours, I probably finally became ketotic and then I really enjoyed it because I would meet heaven. I would just feel so fantastic. I’d get this euphoric state. I think that’s why I really continued. Now I can get that euphoric state within an hour because of I start ketotic. I just get into ketosis much more quickly.

I’m being fastidious. I think there was an element that I really enjoyed running ultramarathons because I would get this incredible feeling. I think it was also because I was writing *Lore of Running* and I was experimenting on myself. I went on running until I’d finally solved the problems of how you should train as I saw it. I wrote that into the book *Lore of Running*. I think that was the result. I was experiencing and using myself to understand running and the physiology and how you adapted to training.

**JM:** And now you’re still running?

**TN:** Yes. I run most mornings. I run an hour, usually an hour, most mornings. But interestingly, in the trial, I suffered a stress fracture because I started training too much. I never had a stress fracture. I started running too much, and then during the trial, my mind was elsewhere and I couldn’t really concentrate enough.

Now that we’re getting towards the end of the trial, my motivation to train has come back and I’m really glad to say my fitness is improving dramatically, which is great. At 67, I’m still lifting. I think it’s because I’m eating this diet. If I was 67 and eating a high-carb diet, I wouldn’t be adapting as I am now. Again, another good reason to follow the diet.

**JM:** I’m curious when you’re in your high carbohydrate days many years ago, I’m wondering how many grams of carbohydrates you were consuming. Was it 200, 300, 400 grams per day?

**TN:** I would guess it was 400 plus. When we loaded for the races, we just went mad. Probably 400 grams, because I was running. If you would think I was running 100 miles a week, 160 kilometers a week, you need to eat a lot of food.

Of course what I didn’t realize at the time was that when I really started running, I was still on the low-carbs because I incorrectly said that I’ve always been on this diet or the high carbohydrate diet. I was raised on real foods by my parents who came from the north of England. I was weaned onto a high-fat diet.

Then I went to medical school and I started running at just the time when the diet changed. I adopted it early on. I had run or two or three years on the old diet. The moment I changed into this diet, I put on 2 kilograms. I could never understand why. The only time I could get rid of those 2 kilograms was when I was running 100 miles a week, then I could get my weight down. But the moment I stop running, I put on 2, 3 or 4 kilograms.
Now, my weight control is perfect. It doesn’t matter whether I run an hour a day or nothing. My weight is exactly the same. That’s what I learned. The tragedy is I know I would have run much better if I’d been on this diet all my life.

I must tell you another wonderful story that one of the people I converted early on to the high-carb diet, Bruce Fordyce. He became South Africa’s ultramarathon runner. He set a world record. He won our big race nine times in a row, which is astonishing. Eventually, we converted him back to the high-fat diet about five years ago because, like me, he was insulin resistant, putting on weight, pre-diabetic. He said, “I wonder what I could have done.” Remember, he set the record. He set performances that took 20 years to beat. He said “I wonder how much better I could have been on this diet when I was a youngster in my 20s running those races.”

**JM:** Yes, indeed. That is a good question to ask because I’m sure it would have been significantly improved. I just wanted to insert, inject a comment in and you can respond to it. There is likely some confusion among people watching this about thinking, “Well, I should be doing the low-carb diet.” Well, yes, if you’re doing ultra-endurance events like a marathon or an ultramarathon, for sure. There’s just no question about it.

When you start exercising for long times, you definitely want to be in a low-carb ketogenic diet. But for high-performance spurt, interval types, that’s not going to be your best bet. It’ll help you from a health perspective, but it won’t optimize your performance like it will on long-distance running. Maybe you can expand on that.

**TN:** Yeah. I get asked the question “What’s the ideal diet?” I say that the ideal diet for sports is the one that’s ideal for life as well. I’m really interested because I spent 20 years of my life studying glucose metabolism in the body during exercise. The question I want to know is how can adding a little bit of carbohydrate make you run faster? For example, if you ingest carbohydrate during exercise, because you’ve got plenty of fat on board, why would you need a little bit of carbohydrate?

To some extent, I think the carbohydrate effect is a drug effect. Particularly during exercise, if you’re taking carbohydrates, I think it’s acting like a drug. Because metabolically, I can’t see how it would make any difference. It’s really interesting. When we do these studies, we take people on high-carbohydrate diets and we put them on a high-fat diet. The performance does come down. But I wonder to what extent, as to the withdrawal of the drug effect as much as a metabolic effect.

I remain unconvinced that only the really elite athletes running the shorter distance races, I think for them, yes. They probably need to be insulin sensitive and eat high carbohydrate diets to run a two-hour marathon. But if you’re running a two-and-a-half or three-hour marathon, I don’t understand why you need carbohydrates.

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**JM:** Thank you for sharing your experience with that. I’m wondering, aside from your research with diabetes, if you have any other items you want to discuss or anecdotes or illustrations from your past in your path and your journey along integrating the low-carbohydrate program.
TN: I think what I’ve really learned is that insulin resistance is the real killer and that we need to understand that. That in my view, the chronic disease of lifestyle has nothing to do with lifestyle – sorry, I shouldn’t say nothing to do with lifestyle – but their main driver is insulin resistance and a high-carbohydrate diet.

What frustrates me is that at my medical school, and I suspect in most medical schools around the world, we don’t teach the students insulin resistance. We don’t because the moment you mention insulin resistance, you’re going to have to speak low-carbohydrate and high-fat, and that’s still anathema to most medical schools. The reason being that they’re influenced so strongly by industry, and industry wants us to believe that eating fat is dangerous for our health and eating carbohydrates is healthy.

What I would like to dedicate the rest of my time to is trying to get medical schools to change the focus of the teaching of nutrition and to admit that we failed by telling people to eat a high carbohydrate diet, and that we have to replace that with an understanding that it’s carbohydrates and insulin resistance that are the problem. The broad range of diseases that we see is linked to that.

There’s a paper out in the Journal of America Medical Association this week showing that Chinese people with diabetes were compared to Chinese people without diabetes. The risk for all the native diseases was two to three times greater. It was frightening. There wasn’t a condition that wasn’t listed there.

We have to realize that we’re heading towards a disaster because we don’t understand that you must treat insulin resistance with a low-carbohydrate diet. Unless we do that, we’re not going to address the health of our nations. We’re just heading towards this catastrophe.

One of the problems is that I lived in an era when children and adults were thin. In the 1960s, everyone was lean. But if you were born in 1990, you wouldn’t know that. You’d see everyone’s fat or the majority of people are fat. That becomes your new norm. Once we did, everyone’s going to think, “Well, actually being 10 kilograms overweight or 20 pounds overweight is the normal.” But it’s not. We used to be very lean. That’s what we’re designed to be. We have to somehow get back to that original state, because humans are designed to be lean. We’re not designed to be fat.

JM: Yes, indeed. It occurred to me as you were giving that summary that I neglected to have you refine your definition of what a low-carbohydrate diet is. Because there are two ways to go, if you reduce carbs, you only have two options: you’re either going to increase fat – and then of course the definition of what types of fats – or protein. I think the mistake that many people make, and certainly those who follow the Atkins, is replacing it with too much protein, which some investigators believe is even more dangerous than excess carbohydrates. Perhaps if you can refine your definition of a low-carb diet.

TN: I kind of leave it up to people. I say the key is to cut the carbohydrates. I argue that there’s no human on earth – maybe this is a bit of an extreme position – I think even if you’re cycling the Tour de France, you don’t need more than 200 grams of carbohydrate a day. That’s my upper limit. For people who are using a lot of exercise, four or five hours of exercise a day, 200 grams of
carbohydrate would be fine, even if you’re insulin resistant, because you’re burning so much carbohydrates, you wouldn’t need to worry. Then on the other extreme are people like myself with type 2 diabetes. You may not go beyond 25 grams of carbohydrate a day.

The range would be for 25 to 100, I guess. However, if you are really athletic and doing a lot of exercise, then you could have more than 100 to 200 grams. But I can’t see any reason why the vast majority of people need more than 100, 150 grams a day. My definition is at 25 to 100 grams would be low-carbohydrate, with the proviso that some people can eat a little bit more, but no one more than 200 grams.

**JM:** Terrific.

**TN:** I must make the other point that dealing with people who have sugar addiction and perhaps carbohydrate addiction and are morbidly obese. What we notice in them is that they are incredibly intolerant to carbohydrates and we’re dealing literally with 10, 20 grams either way. They’re either going to be successful or they aren’t.

The people that I’ve helped to have lost 80, 100 kilograms, that’s 160 to 200 pounds, they literally cannot eat 26 grams of carbohydrates. They have to stick to 25. Once they get up to 50 grams, things start to change. They move back towards the addictive nature. They start to eat more carbohydrate, and very quickly, they’re eating 100, 200, back to 400 grams. People don’t understand that if you have a real weight problem and you’re morbidly obese, you’ve really got to be strict 25 grams and no more.

I think it’s the same with type 2 diabetes. You’ve got to stick to 25 grams. Again, my point is that the margin for error is so small that the reason why diets fail is because we’re taught to eat a balanced diet and to eat some carbohydrate. No one tells you that if you’re insulin resistant or you’re morbidly obese, or if you’re sugar-addicted, you’ve got to be very careful. You have to restrict way down. This seems to me to be some sort of threshold, an addictive threshold as it were. If you cross that threshold, you just go straight back to where you came from.

**JM:** Perhaps it could be, especially in those with type 2 diabetes, a metabolic threshold.

**TN:** Yeah.

**JM:** That these pathways just get triggered once you go over the minimal level. You mentioned that 25 grams seems to be the threshold. That’s an interesting observation. Thank you for sharing that. I think that’s not probably relevant for most people without type 2 diabetes, but that’s like one-third the population are either diabetic or pre-diabetic. It’s certainly optimal.

**TN:** Precisely. I think that in fact, it’s even more than that. It’s more like 50 percent, I would guess.

**JM:** Fifty percent.

**TN:** In California, they claim it’s now 50 percent of Californians.
JM: Wow. That’s a lot of people either way.

TN: Exactly. In a sense, I think this distinction between who has diabetes and who doesn’t is kind of fallacious. Once you’re HbA, you’re glycated hemoglobin, HbA1c, starts to rise, once it’s about 5.5, you’re essentially diabetic. You may not fulfill all our diagnostic criteria, but you’re a diabetic in waiting as it were. They should do something about it. It’s inevitable that you cross the threshold and become diabetic.

JM: Let us remind people. You and I both have been around the block for a while. When we first started practicing and graduated medical school, the definition of diabetes was – I don’t know the conversion is to the metric system, but at least in millimoles – but in the US, in milligrams per deciliter, this is 125. Now, I think it’s down to at least 110. I think many are saying it’s below 100. But you should not have a fasting blood sugar above 100. I mean that’s just ridiculous. But as you mentioned, even more accurate is the hemoglobin A1c, or glycated hemoglobin.

TN: Yeah. Correct. Absolutely. We spend so much time telling people that they must have their cholesterol measured. That’s a complete waste of time. I don’t know what value it is. I don’t know what a practicing physician benefit they get from knowing what your cholesterol is. But if you know what your HbA1c is, you know what the probability is of you getting diabetes, you know whether your diet’s appropriate for your level of insulin resistance and so on. That’s the one thing we need to get across to people.

JM: I’ve interviewed some researchers who believe that inflammation is actually secondary to insulin resistance. It’s not inflammation that causes insulin resistance. It’s the other way around. I’m wondering if looking at inflammatory markers is something you’ve done, like a high-sensitivity c-reactive protein (CRP) levels.

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TN: We haven’t really. But we will be doing that in our research. I quite agree with you. To me, insulin resistance is the – I see it as a genetic variant. The reason I say that is my father died of type 2 diabetes. That’s what really motivated me. Because people, when they die of type 2 diabetes, it’s the most humiliating illness.

He was a wonderful, powerful, strong man. He was just decimated by this disease. I was complicit because I was not treating him. But I didn’t understand that the way he was being treated was not helping him. That kind of motivated me to try to make a difference. We have to understand that this is an awful disease and we need to do something about it early on and not wait until it’s too late.

JM: Absolutely. You’re certainly making a dent now. Before you leave, I just wanted to share a story with you that may have some personal application. You’re about five years older than I am, but I think I started running before you did.

TN: Yes.
JM: The race I won with George Sheehan was in 1980, I think. I was running for 43 years. Towards the end, I started developing some insulin resistance. I started developing gut things, but I think it was because I partially changed my diet. But anyway, it was crazy. I mean you’re running all these miles and you’re gaining weight. It doesn’t make any sense. But I had an epiphany, probably seven, eight, nine years ago now, where I just went outside to run my normal route, which was getting lower and lower, I was down like five miles or so, I just said “I don’t like this anymore.” I stopped running. I stopped. I haven’t run since.

The reason I want to share this with you is because I actually moved to Florida. It’s really beautiful here most of the year. As we’re recording this in January, it’s like 80 degrees Fahrenheit out, at the end of January. I get to walk in the beach every day. That’s what I do. I replaced it with walking. Rather than run five or six miles, I’m walking five or six miles, and reading, enjoying and getting sunshine, not pushing myself and stressing myself out. That’s something that I think that almost everyone can do. None of us was built for running.

We’re really excited and thrilled that you were able to spend some time with us today. We’re recording this at the end of January. We’ll probably not post this video until – We’ll probably hold it until April, until we have the results of your trial so that we can integrate that into the article and tell people that yes, you were victorious. That you beat the system despite the industry funding against you. It’s a tremendous victory and I’m predicting you’re going to win.

TN: Thank you very much. I appreciate that. We’re pretty confident. We did everything possible. We could not have done one more thing. It’s like a marathon. You can only prepare so much, and then you go out for it. We prepared for this like it was the Olympics. I have got the most unbelievable legal team. They did a fantastic job. We’re pretty confident that it’s going to be very successful.

JM: Thanks for enduring the hardship. What I didn’t mention earlier is that they gave you an out. You could’ve said, “Okay. I’ll remove my license and I won’t go to trial.” It would save you loads of time, effort, energy and expenses. But you chose to fight it. You stood up for your beliefs.

TN: But they made one error. Because they tried to humiliate me publicly already by that time, so the public had got the impression that I’d lost my mind and that I was a quack. That was what they were trying to say. Once they did that, I said “No. I’m not prepared not to.” Because that’s how I’ll be remembered.

JM: Yeah. That’s good.

TN: Quite right. They did offer me. They said, “A lesser charge if you’ll just not go to court.” I said, “No way. It’s gotten too far.”

JM: Yeah. Thank you for enduring the hardship for those of us who are pushing the limits. I’ve certainly gone through mine. It’s the classic discrediting strategy that industry uses. They hurl these bullets, assaults and vilification at you to discredit you. When in actuality, all they are seeking to do is obtain a competitive advantage so that they can increase their profits.
TN: Exactly.

JM: To hell with the truth, you know?

TN: Yeah. That will never address the facts. They just ignore the facts.

JM: Absolutely. Thank you for all you do. Keep up the good work.

TN: Thank you. My pleasure. Thank you for a lovely interview. It’s been a huge privilege for me to be on your show. Keep fighting. We’re going to win this one in the long term.

[END]