

Huffines_Sports_Med_Deutz.mp3

Tim Lightfoot: Hello and welcome to the weekly edition of the Huffines Institutes for Sports Medicine and Human Performance Podcast. I'm your host Time Lightfoot and I'm so glad you took the time to download us and join us today as we speak to another interesting individual in the world of sports medicine and human performance and general health. We are so pleased to have with us today Dr. Nicholas Deutz, also known as "Nick Deutz"

I'll tell you a little bit about Dr. Deutz, he is a professor in translational research and aging and longevity in the Department of Health and Kinesiology here at Texas A&M. He has his double doctorate. He has both his medical degree, his MD from the University of Amsterdam and a PhD from the University of Amsterdam as well. He has been here for about a year now.

Nick Deutz: Almost a year.

Tim Lightfoot: Almost a year now. He has over 250 papers published, a wide variety of awards, he is the editor of a couple of professional journals in his area. We are so pleased to have him and his research team in the department. Nick, we are so glad to have you here on the podcast. Thank you for being here today.

Nick Deutz: Thank you, Tim.

Tim Lightfoot: Your primary research area falls under the general umbrella of metabolism.

Nick Deutz: Health, actually.

Tim Lightfoot: And health, right. But you do a lot of metabolism work.

Nick Deutz: Yes.

Tim Lightfoot: The word 'metabolism' is kicked around quite a bit in the lay literature and it seems like...or in the popular press. A lot of people don't know what metabolism is. Let's start there... What is your definition of metabolism and why should we all be concerned about this as a function of health?

Nick Deutz: Metabolism is the flow of nutrients. If you take your carbohydrates immediately in the morning with your breakfast then it has to go somewhere. If you just eat it and it comes out it has no role. So the body has to take it up and convert it to something useful that can be used later on. That is what we call metabolism. And that is for everything in your food, but also in your body of course. If you lose your muscle then metabolism takes care of all those products that come of the muscle wasting and they have to deal with it. That is all metabolism.

Tim Lightfoot: Why are we concerned about that for health? You do a lot of work with supplementation and so forth to help health>

Nick Deutz: You can measure everything in your body, but in the end it is the change in metabolism that is related to your health or to your disease. So if you have a change in your genetic makeup that doesn't have any effect on metabolism it doesn't have an effect. So in the end, it is the final path that leads to good or bad things in your body.

Tim Lightfoot: One of the things we always do is ask is how did you get interested in nutrition and the metabolism side of things? What is your journey to that?

Nick Deutz: The journey actually started when I did my PhD research in Amsterdam. I actually planned to become a neurosurgeon but I got very attracted by the research. And the research was on brain metabolism in situations in which the liver fails. And that started my interest because the main characteristics there are some changes in some amino acid concentrations in the brain. And at the end it became apparent that those same amino acids are actually in your daily food. So that links this interest to nutrition.

My real interest is actually metabolism but nutrition is a way to modify metabolism in the body. It is one of the most important ways actually, because without nutrition you will die. So apparently it is very important what you eat.

That is what went on and then I got my positions and nutrition became more and more important and then you roll in to all kinds of organizations and now I have a really holistic view that nutrition is very good for everything in your body, although we don't know how. But that is what I am doing. I try to understand how it works.

Tim Lightfoot: See, that is what people find interesting, you say that we don't really know how it is important and that is what you are studying. Some people will sit here and go, "Well, I know nutrition is good. It refuels my body" or whatever.

Tell us a little bit about the work you are doing and how you are trying to understand this a little bit better.

05:00

Nick Deutz: My medical background cause me to be interested in disease. So disease is really number one. We know of course that a lot of nutrition regimens that are very common here in the US are not so good for your health. But my main interest is actually that if you are very sick you can lose a lot of your body weight very quickly. If you look at what you actually lose is, of course number one, your fat tissue, but strangely enough you lose fat tissue but you really also lose muscle tissue. So apparently if you stop eating you will only lose fat tissue but your muscle tissue is reasonably maintained. But if you are sick you will lose both fat and also a lot of muscle tissue. And that's what we want to stop.

If you look at those people that lost most of the muscle tissue when they got sick they have the highest chance to die. So that relates to if we can stop this loss of this muscle tissue they actually will live longer. It is a longevity issue. But also they will live better because if you have more strength and your life will be better. For an older person it is really being in bed or being able to go to the restroom. The difference in your power in your muscle is very small to make this huge step.

All the research that we do it defines in trying to reduce the loss of muscle tissue or changes in metabolism when there is a disease and try to use nutrition to stop this loss.

Tim Lightfoot: What changes with disease that causes you to lose the muscle? It is fascinating that you say when you stop eating you lose fat. But if you get sick you lose fat and muscle. So what is a general process that is happening there?

Nick Deutz: There are two ways of looking at it. If you are sick you get all kinds of inflammatory substrates in your plasma that stimulates your metabolism and more specifically it stimulates your protein breakdown. So you can say it is this inflammatory mediators that causes this loss of muscle. But there is also an alternative apparently the body needs something there that can only be provided by the muscle tissue that you have. So that's why it releases all these mediators.

The real issue is what do you actually need when you are sick? What you really need is certain substrates that are very hard to eat, because fat only releases fatty acids that gives you energy but if you lose muscle tissue you will lose protein. And this protein contains certain amino acids that have specific functions in your body that are very important.

A good example is if you lose muscle tissue you will see a huge production of a specific amino acid, glutamine. This glutamine is very important to maintain your gut function. So here you link something in your muscle to something in your gut. This glutamine is also taken up by your liver and generate there very important substrates. Energy alone is not enough to reduce your muscle loss. Muscle can generate specific nutrients.

The link to nutrition then is very clear. Because if muscle generates this amino acid, glutamine, that is important than why not give this glutamine to this individual and then maybe the muscle loss will reduce. As usual, it is not so simple of course.

Tim Lightfoot: Biology never is, is it?

Nick Deutz: But this is what is done in many hospitals. They give specific nutrition with high levels of glutamine with this basic idea to reduce the muscle loss in these patients.

Tim Lightfoot: Isn't glutamine also used in the brain?

Nick Deutz: Glutamine is mainly produced in the brain and it is actually released from the brain. But the muscle is by far the highest producer.

One about glutamine, and that is the type of thing we do...the glutamine then is taken up by the gut, but that is not the end of the story...because, then another nutrient is produced that is, citrulline, that is taken up by the kidney and in the kidney it produces arginine. This arginine is released again in the blood and that is a precursor of nitric oxide which is what you need to get rid of all the bacteria in case you have an infection.

There is a huge inter-organ transport of nutrients and that is all the things that we actually study. We study the flow from one organ to another or we study how much is actually produced in the body. What is very important in the research is that some people, for instance, they measure your glucose when you are sick and your glucose goes up and then everybody thinks that you produce more glucose and we should reduce it. But, if plasma concentration goes up it also can mean that your body uses less. So you can actually stimulate the body to take it up. And this is exactly the point, you should have ways to measure the actual production and the actual consumption of a nutrient in the body. And that is what we do in our research. That is why we have this complicated approach, but they all aim at this very simple thing, how much is actually produced and how much is actually consumed. Measuring the concentration in a blood sample is not sufficient.

10:39

Tim Lightfoot: We are going to come back and talk about how you do that because you do have some unique techniques. But before we get away from the glutamine and arginine and so forth, you had said that hospitals will give people glutamine. Does that work?

Nick Deutz: To prove that something works is very complicated in science. In our science, or course, in nutrition if you test ten individuals and you give them the glutamine there is a chance that you will find an affect. And that is usually the case. They publish studies in which in small number of patients some was beneficial. Then it has to go to a larger study with hundreds of subjects to prove that it is actually working, then it becomes always more difficult and it is always less clear that something helps.

Now in the nutrition world we lack the funding as in the drug world. In the drug world they can do these huge studies. In the nutrition world we do not have a lot of money to do these large studies.

Tim Lightfoot: It is not very sexy for companies to say, "We're just going to spend". So we give people glutamine.

Nick Deutz: That's the problem, we lack these very large studies. So that is why nutrition is always kind of a difficult subject. Everybody will ask you, "Does it really work?" Yeah, we think it really does work but we need large studies but it is hard to find the financing for that.

Tim Lightfoot: Also when you talk about large studies in humans, you are talking about bed rest, you have to find sick individuals. It makes it more difficult...

Nick Deutz: It is actually very difficult and even in the drug study world it is almost impossible to do a study in one place. So you have to do multi-center studies. That we are actually entertaining at the moment, a very large, US wide, multi-center study to look at the benefits of giving nutrition for people who come out of the hospital. A very simple question. You would think it is known, but no it is not known. It is a huge effort to prove that.

Tim Lightfoot: There are so many supplements that say you should take them because they will make you feel better and make you well or whatever. So you are saying there is really not a lot of evidence to support those kinds of claims?

Nick Deutz: No, because all those claims are linked to small studies because none of the companies, except a few, have the resources to actually prove that it is working. You would think...is it good or bad? It can be negative in our nutrition world because patient would think today, "It is good to eat this supplement" and tomorrow they will say, "Eat the other supplement." So people can actually get de-motivated by the idea that they come up with something every day.

But what does really work. That is what I actually try to do, to come up with real proof that something works. And it is sometimes really more simple than you think. You would think we were working on special supplements, but actually just proving that herb supplement is good to give to a patient and something that needs to be prove in certain conditions.

Tim Lightfoot: Which supplements would you suggest right now? Given the limited knowledge, we understand the studies are small and so forth, but you have done some work that have shown there are some positive benefits to some of them.

Nick Deutz: My message, and we just published a very good opinion paper about it that just says it actually doesn't matter which supplement, it matters that this supplement contains a certain amount of proteins of a certain value. And if you look in to my eyes, a researcher working in this are for many years...

Tim Lightfoot: And I'm looking in your eyes right now...

Nick Deutz: That's very good...I believe there is not a lot of real good evidence that doing more than just giving enough nutrients is really more beneficial. And you would think it was so easy. If people get older the real issue there is they start eating less protein and it is not about more glutamine. We are just talking about they should eat more protein and we should put it in a

way that elderly people will cope with that and actually will take it and have a good taste. That is more important. The supplement world is not yet in the scientific world.

15:06

Tim Lightfoot: Yeah, the supplement world are always chasing the magic supplement as opposed to looking at what's...

Nick Deutz: They don't exist. I think you have to be honest. If somebody says a nutrient is very helpful because there was a cactus that produces this nutrients, that is not a guarantee that it is effective. But nobody will really prove it is effective because there are no resources. That is why you have so many different types of supplements. But in the end the best supplement is milk, just milk.

Tim Lightfoot: Good nutrition.

Nick Deutz: Milk itself contains pretty good levels of protein, etc., etc.

Tim Lightfoot: For the audience listening we will link in our show notes to this opinion paper that Dr. Deutz just talked about. We'll put that up so you will have access to that.

Let's back up a little bit and talk about some of the methods you use. You are unique in that you have what we call a four-bed clinical unit here and you can expand that to eight-beds, right?

Nick Deutz: Oh yeah, or even more.

Tim Lightfoot: So this is a place where you can actually bring people in and they can go in to bed for periods of time and look at a variety of things.

Nick Deutz: And we do that.

Tim Lightfoot: That's a really cool approach.

One of the methods you use is stable isotopes. Tell our audience a little bit about what that is and why that is unique and why that is the way to go.

Nick Deutz: Think about this glucose again, if you think about glucose molecules consist of protons on carbon and on oxygen. For instance, take the carbon out, the weight of carbon normally is 12 molecular weight, but you can have carbons that are a little bit more heavy and they have a molecular weight of 13. But it is still the same glucose. And actually in the normal glucose in your body, a small fraction of the carbons are 13 instead of 12 because it is a natural occurring isotope. But you can enrich glucose until all the carbons are 13 instead of 12. It is still the same glucose, it has the same metabolic pathways, everything is the same but it is a little bit heavier.

If you are then able to measure or distinguish the carbon-13 glucose from the carbon-12 glucose you have a tracer that can trace all the metabolic routes that glucose takes and that is exactly the background of what we do. We can follow those nutrients, you can give somebody a meal but you label all the glucose with 13 and then if you look in the blood you can actually see what comes from your meal because it is carbon-13, while in your body everything is carbon-12. So you can distinguish what is used from your meal and then you can follow that metabolism. You can do that with any substrate.

Tim Lightfoot: That is a really cool approach. It goes back to what you said earlier, if you give somebody something then you can trace it and then you find out what it is actually doing and not doing.

Nick Deutz: These stable isotopes are not radioactive, you can give them to pre-term babies, to pregnant women, they are completely harmless. You just need very expensive, high quality equipment to be able to detect them in your body.

Tim Lightfoot: And you have one of those centers. You have a mass-spec.

Nick Deutz: We have several mass-spec's in the lab to be able to measure these somewhat heavier molecules.

Tim Lightfoot: We'll brag on you a little bit more. You are funded by the federal government to do this. So that's a really cool approach. There are not a lot of centers that are using that same approach in this area which makes you unique with some of the things that you do.

The question I often get is how many other people in the country are doing the same thing you are, for our work? If I ask you that question, what do you think the prevalence of that is?

Nick Deutz: I think there are three or four in the US doing this approach. Because you need to be substantially funded to be able to have this equipment and you need a background of understanding metabolism and you need a background understanding tracing all the metabolic routes. You need almost an overall knowledge of how the body works. If I give you this trace of nutrition it will go to your muscle, but it will also go to your kidney, it will also go to your liver, it will also go to your brain. You have to understand the body, a medical background is very important in our field.

Tim Lightfoot: So you have to be an integrative physiologist, biochemist, nutritionist...

Nick Deutz: Yeah.

Tim Lightfoot: A little bit of everything.

Nick Deutz: And medical.

Tim Lightfoot: We are running short on time. We have really enjoyed having you here. Can you give us a take home message for the audience? What do you want them to remember?

Nick Deutz: What they should remember is really that nutrition matters. Also if you are sick it even matters more when you are sick. And if you are older and you are sick it becomes one of the most important things you can do as a patient to improve your condition. That's really the take home message here and that is what I tell everybody.

Tim Lightfoot: Excellent.

Thank you for taking time to be with us today. I've enjoyed it.

And thank all of you for taking the time to download us and listen today. If you've been waiting for our podcast question of the week here is our producer, Kelly, with that questions.

Kelly: What is one of the most important ways to modify metabolism?

Tim Lightfoot: Super question. Be the first one to sent us the answer to that question. You can send us an email at huffinesspodcast@TAMU.edu and you'll win one of our nifty podcast T-shirts. Again, hurry up, we keep saying we are running out of our second editions. If you want to keep your collection complete you'll need to get this second edition. Don't think you are too late to answer. Just send us that email when you get a chance.

Dr. Deutz, thank you again for being with us. We're going to have to bring you back at some point to talk more about some of these other supplements.

Nick Deutz: That's fine.

Tim Lightfoot: Thank you all for taking the time to download us and be with us this week. We hope that you join us next week for another interesting individual in the world of sports medicine and human performance and general health. Until then we hope that you stay active and have a healthy week.