



## Conscious Life presents

### Unlocking Secrets: Optimizing Testosterone Levels

Guest: Pete Williams

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#### **[00:00:09] Dr Anu Arasu**

Hi, everybody. I'm Dr Anu, co-host of the Hormone Super Conference. Today I'm joined by Pete Williams. Pete is one of the most experienced functional medicine practitioners in the UK. He's IFMCP certified and Bredesen Protocol certified, and he has a specialist interest in neurodegenerative disease. Welcome, Pete.

#### **Pete Williams**

Thanks, Anu. I appreciate being called up to come and have a chat. That's really nice of you.

#### **Dr Anu Arasu**

Well, thanks for coming on today and I would love to get your opinion on men's health. What should the guys out there who are listening, what should they be doing to keep themselves in optimal health and particularly to maintain their testosterone levels, which can be affected by so many things like stress?

#### **Pete Williams**

Really good question. I think probably the easiest way for me to go about our conversation is really to give you an idea of, if I have a male patient coming in, how do I work them up, and how does that relate to testosterone levels? I always wish that you could get a male at a certain age who is in the peak of their fitness and believe they're in that range, and maybe take the testosterone levels there. So you get this baseline of how optimal they are and where that optimal testosterone level may be, but we never get to do that.

I suppose what I'm always looking at is that, what is the most optimal testosterone level for this individual at any one time? Are we going to get some data on that? Because, as you know, there are so many things that go into testing someone, time of day, what else is happening? Have they done a lot of exercise beforehand? It's really difficult to get a testosterone level test that gives you a really distinct optimal level, because there's so many things that could mitigate, maybe not getting the result that you want.

**[00:02:14]**

The other thing about that is obviously the range for testosterone is so vast, you don't know what's optimal for that patient. I think on that side, you've always got to go with a more symptomatic presentation with regards to some of the symptoms with reduced testosterone. So there's a lot in play there with regards to what is optimal, what is normal, and what do we do about it?

I suppose the key thing for a patient coming in, for me, is trying to always get that functional medicine approach where you're looking at the whole system. Generally, I would say I've gone off, really not so much testing testosterone all the time, and in fact, I do that very infrequently now because generally there would be always a reason why testosterone is generally lower than we would like.

This is where you've got to tell a patient about how we're looking at the bigger picture. These are, if you like, part of the bottom of their cascade in regards to hormones, and they're affected by every other hormone and particularly stress.

It's almost, as I said to you, I start with, if we're looking at does chronic stress affect testosterone production, or optimal testosterone levels with an individual, then I usually start from an answer of, yes, most likely.

It's not that I won't go to test, to look at those testosterone levels. I just find that sometimes there are so many mitigating factors that may not be giving me an ideal result, then I would start... Well, maybe we should start and find out how much stress you're under, and whether that is just a conversation, tell me about your life, or whether that is something where we will go on and look at cortisol levels. They would be the way that I would start thinking about it.

In very basic terms, I always look at hormones from a point of view of what's the most important ones for life, and they tend to be dominated by stress hormones. So stress hormones are elevated, or the life situation is showing higher stress, then I would expect, through no fault of physiology, it's sort of normal physiology, that maybe testosterone levels aren't going to be as optimal as we would like, because you've got, as I said to you, you've got that combination of, you can't have everything firing in optimal levels in one go. And stress hormones always dominate the hormonal picture and obviously have an influence on stress hormones.

There's no doubt that long-term stresses, and it's not so much the long-term stresses, it's the incapacity to not be able to have the ability to deal with the stresses that is the main component for me. That is fundamentally where I always start, how stressed are you and what else is going on? And then I lead into the sort of states of health, whether that is body fat, obesity, type 2 diabetes, metabolic syndrome, all of those encompassing disorders. That's my next port of call. I want to look into that. I want to get some understanding of that because they tend to drive testosterone levels down.

There's a really good argument in the literature about what's driving what. It's clear that the state of being overweight and having more body fat and having poor sugar regulation. So a type 2 diabetic or someone who's got a high BMI, high body fat, alters testosterone levels negatively. But there's always a bi-directional relationship. You're in this situation of what's driving what? When I'm

trying to influence testosterone levels for the longer picture, I've got to look at the other aspects that might be keeping it down.

**[00:06:31]**

It's incredibly rare that I start focusing on testosterone. I focus on the other aspects with regards to, if we're obese, we need to really start bringing that body fat down. And that is because the associations with obesity and lower testosterone levels are very strong, and in particular, looking at obesity and particularly visceral fat.

I'm not really going for an understanding where their testosterone levels are sitting. I'd be more interested in a very cheap and inexpensive DEXA scan that's given as an indication of total body fat. But importantly, visceral adipose tissue, simply because the higher the visceral adipose tissue, and that's the sort of fat that is deposited around the organs, certainly around the waist, has quite a stronger, dramatic effect with regards to lowering testosterone levels.

I'm always trying to take a patient and look at them from a point of view of, there's an acceptance that there may be some prerequisites why their testosterone levels may be not optimal, and we're seeing maybe some of the symptoms of that, but then I want to go to, "Well, what are the root causes of that?" And generally, obesity, inflammation, of course, and pro-inflammatory states have quite a strong effect with regards to testosterone levels and secretion.

They tend to be my two focuses. I want to know where we are from a point of view of type 2 diabetic, metabolic syndrome and obesity aspect, and throw them all in and then start from there and try and build out a long-term strategy. I'm really moving those patients into those lifestyle modifications.

Let me give you an example of that, is that we're trying to develop a strategy where we want to bring the body fat down and maybe focus on some of the external influences that not only help us with that, but also have a dramatic influence on testosterone levels.

The key player for me is always alcohol. Alcohol has a direct influence on reducing testosterone levels and, of course, has a double whammy because it also stimulates aromatase as well. So you've got that double whammy from alcohol. I'm always trying to get the lowest hanging fruits in the first place. If you've got an individual who's highly stressed and is trying to compensate from that high stress by drinking a lot of alcohol, you can understand where you've got to go to try and bring it down.

In general, what it's doing there, is that it's a real low hanging fruit that maximizes potential outcomes. So alcohol would be one. But before we do that, obviously we've got to understand why people may be drinking more alcohol than we would like? And generally it's because life's pretty stressful and shitty and it really helps them.

Alcohol is a really interesting molecule because it's actually really quite a beautiful molecule, in the fact that it ticks a lot of boxes from a point of view of nice molecules, serotonin, dopamine, and it really makes us feel a bit better. And this is the crux of alcohol, because actually, if you've had a really hard day and you've not been rewarded from that day because your stress levels are high, then alcohol does an amazing job of really bringing you back into that sweet spot. But also the

negatives come with that. I'm very keen to get an understanding of where we are from a point of view of lifestyle modification.

**[00:10:17]**

I look at those in three major factors. Number one, are you physically fit? And if you're not, what do we need to do about that? I would say when we're talking about physical fitness, you can dig into the literature and say this is the best way to train from a point of view of maybe secreting more testosterone.

But overall, I think that pales into significance from a point of view of most people aren't consistent enough. Anything that makes them more consistent is better for the bigger picture. It's better for an inflammatory control and it's better from, we could argue, is aerobic training better than resistance training for stimulating testosterone? I don't think that is an argument that I need to get into until we're much further down the line, because most people just aren't training consistently enough.

It doesn't matter what it is they're doing, it's just that they're doing something and they're doing that consistently over time. I want to be able to put people into strategies that are going to lower fat, that are hopefully going to start to build muscle mass. And I don't really care what that is because I think when we're dealing with individuals, when we read literature with regards to, you should do this or you should do that, sometimes that literature, as you know, you can go in and read the study and you can break that study down and you can go, well, maybe this study actually isn't appropriate for an individual because maybe there are outliers or it just doesn't work for that individual.

It's always a question of, I don't get carried away with studies that show me that certain exercise approaches may be helpful for increasing testosterone levels. If we're looking at that, what is interesting in the literature is that if we took resistance training, so lifting weights, there's no real significant increase in testosterone from a weight training session. I think if you look at Professor Stu Phillips's work, it's pretty clear that you're not going to get a massive, significant lift from resistance training and testosterone.

As we know, testosterone has these peaks and troughs throughout the day. We think there's probably about six or seven peaks. And so whilst you will get some degree of testosterone lift from training, depending on how you do the training, it's not anything more than what you would see in the daily diurnal patterns of what we'd see on a normal individual. But you need to be training. I think it comes back to, fundamentally, the basics. I know when I'm dealing with the long-term people who think there may be an issue around testosterone, it's a question of, do you do the basics well?

If you're not doing any physical training, that's a problem from a point of view of your increased risk of obesity. Metabolically, you're being more dysfunctional and you're probably more pro-inflammatory. It brings me back to those three pillars again, because we know they significantly influence testosterone. That would be the first one I would be looking at from that.

**[00:13:33]**

There's no doubt that chronic stress is a player and it is a question of, from that perspective about, how do you mitigate stress? Is it that you need someone to help you understand where you sit with stress and what can we do to mitigate that? You've got that big fundamental picture on that one.

I find sleep quite interesting because, of course, sleep is one of your primary ways that you'll recover. Lowered sleep has quite a significant impact on testosterone levels and recovery in general. It's not just about testosterone levels, it's about how your body recovers from the day. I'm very hot on sleep strategies. So number one on that is that.

What's great about using tech, Oura Rings, Garmins, et cetera, WHOOPs, is that when we're talking about people who drink alcohol at night, you see a very dramatic influence with regards to recovery processes. Of course, anything that interferes with sleep recovery is going to interfere with testosterone levels. Sometimes I'm keen on making sure that individuals, if they can use technology, because you see it playing out on a daily basis, and particularly for something like heart rate variability measures, you see particularly alcohol, massively impact sleep.

It doesn't take a lot as well, even one drink will have an influence on heart rate variability. It's all understanding this bigger picture of health is that if you've not slept well that night before, that influences everything.

There's a strong influence with regards to particularly getting into our 40s and 60s. I won't just say men on this, women with regards to sleep quality and potential of obstructive sleep apnea. We know in the literature that obstructive sleep apnea has a strong influence with regards to testosterone levels.

I never want to pull it out because I never treat people with regards to, we're just going to treat testosterone. It's always a question of how we make people healthier within the bigger picture. There's a lot of evidence with regard to obstructive sleep apnea having an influence on testosterone levels and just health in general.

There's some major little tips that I always say, number one, do you snore? And are you snoring consistently? Number two, do you ever wake up, or your wife tells you that you wake up and suddenly you're gasping for breath? Because they are two real signs for me that maybe that should be investigated a bit more. Your risk of sleep apnea as you become more overweight is a proportional risk. Those are the two signs.

Then generally what I'll do if they come in to see me, I'll do a basic Mallampati score, which is where you can just get them to open their mouth and stick their tongue out. I'm really looking at how much I can see of the back of their throat. So the uvula, you can see the punch bag thing that hangs down. It's a question of, I want to be able to see that fully, because the Mallampati score is more and more in the literature. It's not a diagnostic, but it's giving you an indication that maybe there is some kind of obstructive process there.

I have those building up the clinical significance that maybe sleep is an issue. And then I'm very much into making sure that anyone that we see do a lot of training of their tongue, because one of the aspects that causes sleep apnea, number one, is sleep position. Not sleeping on your back,

sleeping on your sides is going to be much more important because it allows the tongue to fall forward, and that doesn't obstruct a mouth, but you really want that tongue strong enough that it can sit at the top of the mouth and you can breathe effectively, because anything that reduces...

#### **[00:17:44]**

This is not just about testosterone levels, this is about the reduction in that oxygen saturation at night that just has so much influence. Particularly, as I said to you, I'm very much interested in neurodegeneration, and that's one of the key players, really, is that sleep apnea and obstructive sleep apnea has a strong influence on increased risk of dementia and Alzheimer's.

I'm very hot with our patients with regards to how you sleep, where you sleep, the effects of alcohol and sleep position. Interestingly, there's a paper that recently came out a couple of years back, and that was actually looking at sleep position and glymphatic drainage, and whether that was a risk reduction for Alzheimer's. It does seem to see that if you sleep on your right hand side, then that has a more beneficial effect for glymphatic drainage.

Glymphatic drainage is very simply, in effect, it's how your brain allows the binman to take all the rubbish out of the brain at night. It allows that function to happen. So I'm very keen on people who are at that risk of neurodegeneration, that we're at least having a conversation with regards to sleep quality. A lot of that also comes into sleep position.

There's some really good people, there's a group in Manchester who are doing some development with regards to pillows and anatomical positions. So we've just started getting into that, and that seems to be quite beneficial. So we've gone around sleep, but if you're not sleeping well, you're on a hiding to nothing.

If you don't sleep well, your risk of type 2 diabetes, which is very well recognized in the literature, goes up massively, as does the risk of obesity and neurodegeneration. And of course, they all go up because the mechanisms that are driving one disease are generally the mechanisms that are driving everything else. I'm very keen on not saying, look, you've got three different diseases, you've got three different scenarios that are underpinned by very similar mechanisms. If we can get on top of those, we can get on top of everything else, which all ties back to having a more beneficial effect on testosterone levels as we age.

Then we've got diet. I think the key on that is... I've actually done quite a lot of research into dietary strategies and testosterone. I think I would say where I am now, I would say the literature is inconclusive with regards to what's the best dietary approach. Some that really surprised me. I think there was a paper in 2018 that looked at higher protein levels and they stratified that as greater than 35% in a diet actually had quite a negative effect on testosterone levels, which is something that you would think, well, maybe that wouldn't be the case.

I think where I stand on what is the best dietary approach, I think it's always a question of it has to be individually based. I look at the dietary approach from what is going to be the best dietary approach for that individual. I will do that based on building quite a bit of background data sets, whether that's genomics and maybe some of the more sophisticated nutraceutical testing.

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That said, it always starts with just how good overall do we think your diet is? And these are really simple strategies, because I look at, okay, if your diet is full of what we may consider refined, ultra processed foods, then that's got to go. That has a clear influence on that. I don't get too carried away with it, this food has been proven to increase testosterone levels, because I don't think the literature is clear enough on that.

But I will come in and talk about a few things. So my question is that let's start from a point of view of what are potentially negative aspects of your food, and then build out to just building as unprocessed natural food approach with great color and diversity in there that is also going to be beneficial for the microbiome and build out from there.

Once we're doing that, we can start getting a little bit more fancy with regards to what foods we want to maybe work on. What I would look for is that, I'm not getting too fancy with the food choices. I like to do some nutraceutical testing, because what that does is it allows me to look at some of the vitamins and minerals that are potentially associated with lowered levels of some of the mechanisms that might drive a lowered testosterone level.

I'll give you an example of that. Folic acid and B6 definitely have a role where they increase hypothalamic stimulation of testosterone and dopamine. If someone is genetically a poor methylator, then there may be an influence of understanding how we want to methylate them correctly. B6 does seem to have a really good role with regards to... Also, it seems to be a real friend with regards to carrying, delivering amino acids to the place where it wants to go, but it does seem to have a relationship with reducing prolactin levels in the literature.

I'm not saying here you go out and start taking B6. What I'm saying is, in the bigger picture, if there are some vitamins and minerals that are subnormal, then we might want to give some supplementation to help that. Of course, if you've got an individual, and we just talked about folate and B6, that maybe don't methylate correctly, and you've got that genetic data, then that always gives you an understanding that, not just from a point of view of helping testosterone, but from a point of view of helping everything else that methylation is involved with, which is pretty much everything else, you're taking that blinkered view, but then bringing it out to a more systemic view.

From an overall health perspective, vitamin D, there's nothing that that prohormone doesn't seem to be able to do. It does have a role with regulating some of the systems that are involved with testosterone production. And there's definitely evidence to show that if you have subnormal or deficient vitamin D, then it can have an influence on total and free levels of testosterone. On that side, it's not so much that I'm giving you this to deal with the testosterone levels, as I'm giving you to give you vitamin D, because there's a receptor in every single cell. It'd be crazy for us not to get you up to what we would consider an optimal level.

Where I am with that, optimal levels, I tend to work the minimum, particularly in the winter the minimum I like to get people is to 125. I do that because the data from the COVID research with vitamin D would suggest that that's the minimal level where vitamin D really does seem to have a really productive influence on the immune system and reduces your risk of getting COVID. And given where we've been in the last few years, 125 is the absolute minimum I want to work from. At

150, I'm pretty happy, we're sitting probably in a nice sweet spot. I will tend to do, depending on individuals, surprisingly, we see a lot of individuals that have very poor vitamin D genomics.

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What I like to do on that is that I will, number one, if we've got patients that we've done the genomics on, we get the capacity to develop a regime that you're generally testing those patients twice a year. I like to do my testing on those patients as we come into mid-autumn because we're getting an idea of how the summer has treated them. And then generally January is the second time that I would do that because they've had a decent block of autumn and winter. And obviously most colds and infections happen generally on the back end of the winter.

I want to make sure that the vitamin D levels, not only from a point of view of that immuno-regulatory aspect, is important because obviously, if too much stimulation of the immune system means we're going to have more inflammation, that means we're going to drop the testosterone levels down.

There's multiple inputs of where vitamin D has a role with that. Now, of course, with vitamin D comes vitamin K, because obviously they're quite influential on allowing particularly calcium to go to the appropriate point. Interestingly, with vitamin K, it does seem to have an influence on some of the enzymes associated with testosterone synthesis.

What you're building here goes back to, maybe we should just start with continuing to make sure the diet is as good as possible because we're trying to tick our boxes on many aspects of that. Magnesium has a big influence with regards to the biological availability of testosterone. I've been testing people for 25 years, and I think I do quite rigorous testing around vitamins and minerals.

I've never ever seen anyone with normal magnesium levels on tests. I think about that, and I just think maybe we're just in a life now where it's almost impossible to do without additional supplementation. I've never seen it. So it's just an interesting aspect that... Maybe it's my group that comes in to see me, that some are sick, but also we have people who are trying to do optimal aging and they're in great shape. It's not something that I ever see, normal magnesium levels and of course that is going to have an influence with regards to...

Do you want to say something, Anu?

**Dr Anu Arasu**

I wanted to ask you actually about that subject, which is how... You do a lot of testing. How often do you see people who are lacking a micronutrient and how much does that correlate with symptoms?

**Pete Williams**

Almost all the time. I've come to the decision, as I said to you... I can only give you my experience, but I've had 25 years and I do a lot of testing. Whilst I'm giving you my experience with regards to what I see in practice day-to-day, I think on the food aspect, I think it really comes into understanding what's going on.



**[00:28:56]**

Here's what I generally say to patients is that, number one, the quality of the food that you put in your mouth is the first step. You need higher and higher quality food, first step.

The next step really is, is your digestive capacity capable of breaking down that high quality food and absorbing and assimilating it effectively? In my opinion that doesn't happen in a large proportion of my patients, regardless of their health.

The third aspect then is that can that food be broken down effectively and then transported to the cell? Because generally that doesn't happen as well.

And then number four, you've really got what other genetic predispositions may mean that this individual needs more? I mean that maybe they're a poor methylator and does that mean that they might always need a multivitamin mineral with methylated B vitamins on a daily basis?

That's where it comes to for me, because that's the conundrum where it's not a question... And I say that because we will see people with digestive disorders where you can throw very high quality supplementation at them and it doesn't really give you the results that you want. It's not as simple, and I think there's a lot of frustration in the general public, "I did this and it didn't work." And as I say to people, you have to understand on a much deeper level that X, Y and Z have to work effectively for you to get the maximum out of it.

We've learned a lot. Free supplementation from a point of view of, we only supplement people generally based on data. And even with that, it's sometimes a real struggle to get... Let's assume with magnesium, we get a test back that tells us that maybe this patient is missing 400 additional mgs a day, and we give them 400mgs, and we come back on test, and that test is telling us that regardless of whether you dose them correctly, they're still missing another 200. So there's something that's gone wrong with some of those processes.

It's not the supplement's fault. It's a question of that, it's an incredibly complex process that needs a lot of things to work at any one time for it to work. And of course, what you've always got is that you have an environment where every single day is different and you can never control someone's life. There's always mitigating variables that you may not be able to control.

It's a real struggle, and I think it's a real struggle from a point of view of getting it right on that side. But one of the key players that you've always heard for testosterone is zinc. And zinc is heavily involved with testosterone production, but it's also heavily involved with a bi-directional relationship with prolactin secretion. If you've got optimal zinc levels, it helps testosterone, but it reduces prolactin. Of course, prolactin will work antagonistically against zinc.

What I would also say, and I think this also links into a lot of what we see at the moment, too many calories, too low calories affects testosterone. And unfortunately, we see a lot of this problem with regards to the optimal aging group and whether maybe doing a lot of intermittent fasting and maybe just surviving on one or two meals a day. There's an argument for that. And what I tend to say to them is, how do you feel when you're doing this? Because if you feel rubbish, then maybe

the amount of calories that you're taking in just isn't sufficient enough for you to drive physiology correctly.

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When we put data sets together, we can start to see where that becomes more problematic. It's not that I don't believe there's good literature on that, I think it's a really good idea sometimes to maybe miss a meal. But I can tell you that we have men and women where they do too much of that. And then when I do the yearly DEXA scans for them, looking at muscle mass, they've adversely lost too much muscle mass because they're not feeding themselves enough to promote muscle growth. When you don't have enough calories, your testosterone levels really cannot be sufficiently adequate on that side. It's a real...

When you build a program, it's like the first time you go in for your fitting, for your wedding dress. You've got an idea of where it's at, but it's got to be pulled out and tucked in all the time, and you've got to ebb and flow with that protocol. And the more data sets you get in over time, the more you can adjust things, because you're always working on an ever-changing situation on that side.

They're just some examples of some vitamins and minerals that if they're missing in the diet, then it can be problematic. It brings it back to, we've just got to make sure that the dietary input is increasing in quality as we go, and then we can layer on these more informative data sets. Whether that's nutrient testing, whether that is genomic testing. That all just gives us another layer of personalization to tell us that maybe this is the right or wrong thing to do.

Can I talk about a few other things? Because there's a few other things, lifestyle-wise, that I think are really important. One of them, of course, is the impact of dopamine on testosterone levels. So dopamine is this neurotransmitter, its main involvement, I like to think it's the sex, drugs and shopping reward molecule. I'm always looking for a greater understanding of someone's life, which generally is associated with stress. Not so much stress, but the stress with a distinct lack of reward.

That's where I get slightly concerned about the patients that come in who are in high power jobs and are using alcohol as the guide to soften a hard day, because that's their reward. I do quite a bit of genomics around dopamine because I want to identify whether I have an individual who is more genetically predisposed to lower dopamine. Because if they are, and you put on top of that, a highly stressful environment, it accelerates the risk of that patient looking for something where they're going to fill up their dopamine cup.

These patients always are patients that maybe never produce optimal dopamine levels. And you put a stressful situation on that, it means that the dopamine glass is never full. Therefore, the more at risk of looking for products or a lifestyle that looks to hyper-stimulate dopamine. Sex addiction, shopping addiction you would see as well, alcohol, drugs. I'm looking for those warning signals because of the lack of dopamine. Dopamine has a really strong influence on testosterone level, but involved with that is another social bonding hormone called oxytocin.

I'm trying to get this bigger understanding of the relationships they have. How is it at home? Because I want to get this understanding of, if there's no good things on a daily basis, we're going

to have less oxytocin, we're going to have less dopamine, and we're probably going to have less testosterone. I always ask them on a daily basis, what are the good things that happen in a day? What are the good things that you do? Because if you do good things, you stimulate oxytocin, you stimulate dopamine, and that generally has a positive influence on testosterone.

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I'm always looking to see whether that is part and parcel of their life, because for a lot of people it's not. They're in these very high power jobs with high stress. But actually, do you know what? There's no good thing in the day. There's no good things that make them feel good or make them feel as though there's a reward for their hard day, except for the sex, drugs and rock and roll aspect, is there. So that's one of the other aspects I look at, when I'm looking at from a lifestyle perspective.

There's got to be something that makes you feel like you've done a good thing in the day that's going to stimulate some of those other neurotransmitters and molecules that are associated with the bigger picture of testosterone on that side.

I suppose the other thing, when I'm looking at... There are a couple of other questions that you talked about from a point of view of foods, any foods that directly stimulate testosterone. Again, I don't tend to distinguish, if I've looked at the literature, I always come back and say we've got to improve just a dietary quality and we've got to make sure that you're not deficient or suboptimal in a lot of nutrients that are associated with it.

But I don't, on my reading of the literature, recognize that there is anything specific. Sure, shellfish and oysters have a load of zinc, and we've talked about zinc. How that would be having a really low energy, low calorie input is not going to be good for testosterone. Having excessive calorie input is not going to be great for testosterone.

But I don't really get into stuff like, what could I take to try and offset 5-alpha reductase? What would I try and offset, from a point of view of reducing aromatase, which are the sort of enzymes associated with problems around testosterone. I don't really do much on that at all, because if I'm influencing the type 2 diabetic situation, the reduction in body fat, I know we're working on those pathways anyway.

You know what? 5-alpha reductase, the only thing I would say probably, that really probably has reasonable evidence would be saw palmetto green tea seems to be pretty good. As far as aromatase, anything that hyper-stimulates estrogen increases. And again, for me, the key thing on aromatase is that the more body fat you carry, the more aromatase you're going to produce.

I really am looking for some fundamental basics with regards to... We don't need to do so much testing, from a point of view of, we don't need to dig into these so much, but what we do need to do is we need to know how overweight you are, how much body fat you're carrying. Would we look at visceral adipose tissue? But would we just do something as incredibly simple as height-to-waist measures, and use those as guides with regard to testosterone and potentially the relationships with testosterone. I think there's some good evidence on that, that that would be a pretty smart thing to do.

**[00:40:37]**

And of course, on that, you could look at stuff like the cheap-as-chips testing. I will always test for CRP because it's cheap-as-chips to do. The literature is clear that there is an association with CRP and with reduced testosterone levels. If I can get someone on a really, a lifestyle approach that is anti-inflammatory across the board, that is the exercise, the sleep, the stress, the dietary approaches, I know that maybe I'm approaching helping their testosterone levels come up because I am really working on all those multiple pathways that are suppressing the inflammatory pathway aspect.

I can look at individuals with really cheap testing to say, "Look, this is a problem. And until we get it down, we know there's a strong association with testosterone levels". I come away from really measuring total and free testosterone. It's not that I don't do it, I'm expecting to see it. And of course, what I don't know from that is, I don't know what that patient's optimal testosterone level should be at that age. You're always playing on assumptions with that. I think this is where, again, there comes a point where, if we get to the point where I've got to get someone...

As you know, Anu, trying to use hormone replacement therapy has so many nuances that are associated with it. 20 years ago, I think all of that was pretty messed up. But I think what has been great, and I will say this from my experience, because 20 years ago, I was sending people off to so-called hormone specialists, which they were, but they were hormone specialists without a systems-thinking approach. They would just give high-end hormones without thinking about the bigger picture. I've shied away from going to people for that because there's only so much I can do before I go, "Okay..."

It's not that we haven't had patients that come in, and we've done everything from my skill set, and I go, "Do you know what? Maybe we do need a little bit of help", but it's got to be done in a way that, number one, backs up where the literature is. So some keeping up with where the literature is with regards to the approaches we use, rather than oral, maybe transdermal, and how is that done and how is that written? You really do need to go to someone who's doing that day in, day out.

Luckily, I think there's been a real proliferation of good people from that side. For me in particular, I'm comfortable saying, "Okay, let's bring so and so in. And we can bring in that". It's interesting that I know actually... What I've seen coming up in social media, there are these groups coming up offering testosterone replacement therapy. And I don't know how... It seems a little bit like, "We can give you the testosterone, but we're not going to think about everything else".

As you know, there are a lot of... People who have subnormal testosterone are at risk of lots of problems, particularly cardiovascular disease. But it's like that, you've got to be able to play that out over time and see actually whether you're going to see some favorable cardiovascular changes.

I think the risk is there are groups coming out there that are almost like... I don't know their background, so I don't want to judge, but my spider senses come up to say, this looks like a group where you'll do a testosterone test, and they will give you a certain amount of testosterone for a period of time and then not look at anything else.

**[00:45:01]**

Whereas, you know, we know specialists who are doing a fully integrative approach and a full workup, from a point of view of strong family history of issues around prostate, cardiovascular issues, because too much and too little is going to take you either way. I think really that's, for me, the gold standard of, if we are going to do this, how much are we going to give? And you're giving me the minimal dose for the maximal effect, and what are we going to measure over time?

I think that's the exciting thing of where it's gone, because I think there are some real people doing it day in, day out, and I'm good at what I do, but I'm not an expert in that field, and I know from my expertise over a quarter of a century now, if I want to send someone on for testosterone replacement therapy, I want to send this off to someone that I know is doing this day in, day out with a systems thinking approach. Otherwise they're not going to get the gold standard. So I think there's a real swell for that, and I think that's great.

But I would just caution people that, as you know, you can't just go on something that's as powerful as testosterone. Because even with that, even putting people on testosterone, it might be some of the best people in the world. You know, they've got to tweak it. We think we should give you this. We're going to see how that plays out over a period of time. And we're also going to look at certain biomarkers that go with that. To say this is not only given us symptomatic control, but a lot of the markers that were poor, whether that was CRP, whether that was HDL cholesterol, are all moving in the right direction because the risk is you give them too much and you get the negative effects from that as well.

So I think we're definitely more in the world where if you get with the right people, you can get incredible changes and advances very quickly, and I think sometimes people need that. That might be because they spent six months with me and they've done really well, but they're still quite symptomatic on various aspects. That would make a lot of sense.

But also sometimes you have people where they're showing all the symptoms of low testosterone. The tests have come back showing low. What sometimes I like to do is bring them into a consultant straight away whilst we do everything else as well, because just some people are just sad and miserable and need help straight away. And also some of those other risk factors, the HbA1c, the fasting insulin, the HDL cholesterol, the CRP, are all elevated. And sometimes you just want to give them a punch to start whilst you're encompassing that bigger picture that comes around that TRT replacement.

I think that's quite exciting from a point of view of, we've got the capacity to do that now, and that's really helpful.

I think one of the other questions you wanted to know was that in our modern environment, and does that influence, are there pollutants that are not helpful from a point of view of endocrine disruption? I think the answer to that is yes. About 15 years ago, I used to test for stuff like phthalates and parabens. I don't do it anymore. A couple of reasons for that is, number one, they're quite expensive to test and everyone came back positive.

Almost all endocrine disruptors are lipophilic, so they're fatty in nature. And what I'm looking at is, I make an assumption based on the literature that the more body fat you have, the more likely you're

going to have an increased risk of endocrine disruptors. I don't even need to test for them anymore because I would rather spend the £500 or £600 somewhere else.

**[00:49:18]**

But what I would say on that, you are looking at and being exposed to it on a daily basis. And we're probably talking mainly about the estrogen modulating environmental disruptors like phthalates, like parabens. What I'm trying to do here, and the key thing for me is exposure.

One of the key things I look at from that is, number one, when I'm talking about environmental pollutants and toxins, the first thing I always say to people is exposure is number one. You've got to recognize that we don't want to be in places where exposure is problematic, and usually the home is the most problematic place.

So again, I'm trying to move people off products that may contain some of these issues. I'm trying to move them to products that don't contain any issues. And the line I always give to them and says, "It doesn't matter whether you put it in your mouth, or whether you put it in your skin, you're eating it".

If there's chemicals in those products, you're going to eat those chemicals and your body is going to have to try and do something about them. I'm really very keen for them to think about, we need to go as clean as possible with the products that you're going to use on your skin. I'm really keen for people to do that. And then really, I like processes where we can work on them from a point of view of what are the main routes of detoxification that may allow us to help them with that.

Number one, again, is that if I'm trying to shift weight off people, I've got to accept, and we have to accept in the literature, that fat cells, and there is some evidence that some of the mechanisms of obesity are a protection against environmental disruptors. You put on more fat because it's this way that potentially you protect you from the pollutants going elsewhere in the body.

I think there's a reasonable amount of evidence to generally support that. But you also have to accept that if you're going to lose weight off people, then when you start liberating those fat cells, you're also going to liberate some of the toxins that are involved with them. Sometimes what I do with individuals is don't go straight to weight loss. I try and get them healthier from a point of view of, I don't want to particularly work on excessive weight loss to start because I want to make sure that we've got more, from a point of view of detoxification aspects, we're getting those well, and having what I call the exit routes open.

So I would never look to put someone on a significant weight loss program if the fluid intake isn't high, so they're going to the toilet and weeing well, the constipation aspects, they're constipated. I want to make sure exit routes for pollutants are open. I want to make sure, in particular, because one of the main exit routes of metabolized estrogens is through the stool. So I don't want that sort of recirculation of enterohepatic estrogens through beta-glucosidase.

I want to make sure that we are going to the toilet first. That's where the increase in fiber comes in, making sure that we're doing basics to the diet, that we're putting our patient in a better, healthy position to hit them with potential protocols that are involved with weight loss. Because as soon as you get those fat cells liberated, you're going to get an increase of toxic exposure within the

bloodstream. There's a component of that where we've got to be careful that we don't lose weight and make them more toxic in the process, which can happen with some men. And, of course, that will have a negative effect on the body.

### **[00:52:58]**

But overall, when you're talking about, we are unfortunately living in a really toxic soup, and that is going to be more toxic for different individuals. You're going to have more toxicity, the more overweight you are. That's why, when I'm dealing with, as you say, I call it this sort of functional, non-permanent state of low testosterone. It's low because of other things that are happening in the body. When we fix other things, those root-cause fixes, it allows the testosterone to come out.

So it really is simple things, for me, from a point of view of, the more muscle mass and the leaner you are, generally, the more testosterone you're going to have, and the more overweight you are, the more body fat, the more metabolically dysfunctional you are. So your insulin levels, you're more of a risk for type 2 diabetes, the more logical risk that testosterone is not going to be sufficient for you.

It really is just understanding the simplicity of that, within the bigger picture of testosterone and then trying to mitigate a long-term protocol that is specific to the individual.

I think this is the key for me, is that I have a lot of people coming in, and you'll have a lot of these, health notes will say, "Here's the ten things that increase testosterone levels". Well, it might do it in some of the literature, but how does that literature come over to that patient? And how do you build a strategy that is not only something that's going to help that patient now, but is going to help that patient mid term and long term with regards to raising those testosterone levels. And that might mean that you're doing nothing that looks like it's fully associated with testosterone, but it's doing all the root causes and all the mechanisms and all the pathways that will help those testosterone levels, and particularly that HPAG axis, come back into just normality.

That's the way I would try to look at someone, and we work on that for a period of time. But there is always that situation where very occasionally, it just doesn't give us the outcomes that we would like. And that's where I think well-constructed testosterone replacement therapy has a real role to do, because it just gives that extra role and in the right hands, and in the right strategy, it's only going to work really well.

### **Dr Anu Arasu**

Thank you so much, Pete. You've explained that really thoroughly and really beautifully.

### **Pete Williams**

Hopefully I've done a good job for you. I think it's hopefully what people get an understanding from mine, is that I think we've got to move away from one problem, one pathway, which is the old way of looking at things. And that's only the way we treat. We have to look at this from the testosterone secretion in both men and women, as all part of the bigger puzzle. If you can solve the puzzle or really start going down a pathway where you've built a strategy to help solve a puzzle, it will naturally come back into line.

**[00:56:11]**

Now, for some, it just doesn't. And that's where I think, again, well controlled testosterone replacement therapy, where you've got the minimal dose to create maximal effect, is, I just think, so cool that we can do that now. I think that's where the future lies from that perspective.

**Dr Anu Arasu**

Thank you.

**Pete Williams**

Pleasure. Thanks, Anu.