

Bioidentical Hormones:

A Special Interview with Mark Newman

By Dr. Joseph Mercola

JM: Dr. Joseph Mercola

MN: Mark Newman

JM: Bioidentical hormones, a really useful strategy for many people. Challenge? How do you measure them? Hi, this is Dr. Mercola, helping you take control of your health. Today I am joined by Mark Newman, who is the founder of Precision Analytical Labs (PAL) in Oregon, and he also developed the DUTCH Test.

When I was seeing patients, I always had the practical challenge of how do you measure hormones? Because there are so many different ways and there's so much controversies it's surrounded with, with respect to 24-hour urine testing, saliva testing, blood testing, or the newest kid on the block, the DUTCH hormone testing, which we're going to talk about today.

Mark is really innovative. He's been working in the labs for a long time. I believed he has developed the finest, the best, the go-to test that you need to get if you're considering bioidentical hormone therapy. We just want to do an analysis to see exactly what your hormone status is, because it really is a confusing topic. Welcome and thank you for joining us today, Mark.

MN: Happy to be here.

JM: OK. Why don't you give us a little bit more history that's expanded from the brief one that I gave to you and help people understand how you came to develop the expertise to develop a test like this?

MN: Sure. My history is one of vocationally that I always tell people I'm inch-wide and a mile-deep. I've been in a really narrow focus my whole career in that of hormone testing. I've built and directed 24-hour urine testing, then some blood testing, and a whole lot of saliva testing, and over the years looked at really the pros and cons of the three main tests that we look at.

We spent a number of years trying to build the model that we thought would improve the information that you can get from hormone testing using DUTCH (it's an acronym), dried urine test for comprehensive hormones. What we're looking at doing is instead of testing throughout the entire day, is collecting spot urine samples...

JM: Which is really inconvenient.

MN: Yes. So, 24 hours, it can be a bit of a hassle to have to, you know. If you have to collect a certain day and you have to go to work, it can be a bit of a hassle, which is where the advantage of a saliva test comes in. It's a lot easier to do. But you're missing information. Any test you pick. That was my frustration.

A urine test gives you metabolites you simply can't get in a blood test or a saliva test. It can really change the course of your treatment, change the interpretation of what's going on with the patient. But in that test, the collection's not friendliest.

The biggest issue is that the hormones change throughout the day. Mainly, we're talking about cortisol but also melatonin. Cortisol bounces up as soon as you get up, or we hope that it does. In those first 10 minutes of the day, we're having this cortisol awakening response. The cortisol really goes up a lot higher and then it comes down somewhat sharply, and then it begins to drift down, down, down throughout the day.

That diurnal pattern, that up and down pattern, if that is dysfunctional, if you're low in the morning and high at night, you've got a serious problem. But a 24-hour urine doesn't show you that. That's really the advantage of a saliva test. The point of the DUTCH test was to capture all of that information. Our individual samples, we're testing multiple times throughout the day to get that cortisol pattern.

Then we're taking an aggregate (it's a little bit sophisticated, but just a short version), an aggregate of those samples and getting a correlation to a 24-hour collection for the hormones that don't have that circadian rhythm where we just want to know, "Hey, how much do you make?" Estrogen, progesterone, testosterone, those types of hormones.

What you get is this uniquely comprehensive look at the hormones, their metabolites, and the cortisol picture as it changes throughout the day to give you all of that information. But then in a natural byproduct, it's easy to do.

JM: Thank you for that expansion. Let me just go into some of the specific details of the mechanics of actually performing the test before we get into the magnificence and the brilliance of the analysis and the interpretation that you provide through the testing system.

I've done all three: the 24-hour collection, the saliva, blood, and yours – actually it's four. The challenge with those, for those who have not done a saliva test previously, is that it takes quite a while. It's not a few seconds; it's a few minutes. It may be 10 minutes. You got to continue to generate saliva and put it in this vial. It's really tedious and... Challenging, I guess would be the kindest way to describe it.

It is simple but it's just not as simple as the DUTCH test. This, to me, is the absolute easiest. Certainly with respect to the information, you could do a blood test. It's easier than a blood test because it's convenient, in your own home. All you do is pee on a strip and let it dry. That's the only challenge of this. You have to let those strips dry, which is not really a big challenge, but you know. You tape it on a table or something and dry before you send it in.

But it's a great test. I think it wins hands down by any stretch of the imagination for convenience. Nothing beats it. As you alluded, the information you get from them is spectacular and far exceeds the value you get from almost all the other tests. Not that they're invalid. There's a place for all of them actually. But if you want a starting spot or a screen, this, to me, is a hands-down winner bar none.

Why don't we go into some limitations of the other tests that you described? You discussed the mechanics of how they actually occur, but let's describe what information they provide.

MN: Right. If you start with blood testing, that's the most common. I think sometimes as you veer into, call it alternative medicine, call it what you will, sometimes there's an overreaction and more of a negative feeling for blood testing than there really needs to be. Because for reproductive hormones, they're a good test. Looking at your estrogen, looking at your testosterone, and progesterone, that's a good way to test.

What you're really missing are two things: one is the metabolites of those hormones.

JM: Excuse me for interrupting. They're good tests because there's not a diurnal variation. Is that the primary reason?

MN: Yeah. Most of those hormones, they can fluctuate a little bit throughout the day. But generally speaking, there's really good solid research that says your testosterone value, as measured in the morning in serum, is a number that has meaning. The same with progesterone. If a woman is making a lot of progesterone, you're going to see it in her blood. It may bounce around a little bit throughout the day. That's an advantage of a urine test. It's going to average out those peaks and valleys. But those are still solid tests in blood. Again, what you're getting in the urine test is you're just adding to that picture.

If I take estrogen, I can say, OK, this woman over here, (and I'm thinking of a specific case), she's high for estrogen and she's got symptoms. She's got estrogen dominant symptoms. Then as I look in the urine, I see, AHA, your metabolites, I would expect them to also be high, because you're making all of this urine, but they're not. If you look at the specific pattern, you can see that there is sluggish clearance of this estrogen.

In the particular case I'm thinking of, we were able to give her some supplements to speed up that specific enzyme that clears that estrogen. Her estrogen levels have redialed that main estrogen she was making. It comes down as the clearance speeds up like it's supposed to. But that's a bit of information we only knew because we're able to look at all these metabolites, the whole family of estrogens, and say, OK, we can get a more precise picture of what's going on. You're getting added information on the reproductive hormones.

Then you move into the adrenal hormones, and that's really the biggest area where serum falls short. Serum is a good way to test, but it's not a great way to test cortisol. Cortisol in serum only, that's just stress hormone. That's going to give me energy. If I've got too much of it, I might be looking at anxiety, depression, weight gain, and issues like that. We want it to be where it's supposed to be.

If I look in serum, I get a total cortisol. That's a place to start, but if I move into either saliva or the DUTCH testing, now I'm getting free cortisol. That's better. But not only that, I'm getting the pattern throughout the day, and that's another improvement. We can get more information on that cortisol, those adrenal hormones, by looking at saliva or looking at urine.

Then we find that saliva is still missing one big piece of information. That is the metabolites of the cortisol. I think the importance of that is starting to be better known. In the best case you can look at that is obesity. When you look at obese people, you get a lot of situations where really you can get misinformation for the patient if you're not looking at all these information.

Here's what happens: you get obese, you make more cortisol. You're making lots of cortisol typically if you're obese. But salivary values and serum values don't go up. But the urine metabolites, that's where it all is. You increase the production of cortisol and you increase the clearance of cortisol, so you get this load of cortisol that's found in the urine but only as a metabolite. You're going to potentially really be misinformed on what's going on for these hormones if you're not looking at the hormones and the metabolites as well as that pattern throughout the day.

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It's really a three-dimensional picture. That's really what drove us to develop this test. If I get one dimension in serum and I get two dimensions in saliva, I can give all three dimensions by looking at this unique model, then I think I'm doing a better job of characterizing the patient with respect to those hormones, so we can treat them better.

JM: Yes indeed. And understand what the underlying pathology is. In many cases, the actual metabolites of the hormone are more significant than the actual hormone like testosterone, I would think. One its primary metabolites is DHT or dihydrotestosterone, which is believed to be one of the primary risk factors for cancer, prostate cancer. You want high levels of natural testosterone, but you want to have those conversion pathway to DHT minimized, so that you don't have excessive amounts of that metabolite.

MN: Right. Very practically, we see this play out a lot in females especially as you make testosterone, that's good. But if you're making too much of it, that's not a good thing. You can see that in blood. You can see that in saliva. You can see that in urine. But when you go that extra step that you mentioned and say, "OK, I'm going to get more of these symptoms of high testosterone," say, I've got polycystic ovarian syndrome, where that testosterone is shoveling towards DHT and making me even more androgenic facial hair, thinning scalp, hair acne.

You can evaluate that. Which way is that testosterone going? Not only that, if it's not the problem, you're not treating the problem you don't have. If that is part of your problem that's causing these symptoms, there are very natural things that you can do to go and intercede there and try to shift that back in a way that's going to be healthier for you in terms of feeling better and getting rid of symptoms that you're not wanting that are related to not just the hormones but also the metabolites.

JM: Thanks. To help people better understand this process, describe a few specific patient ill cases, which would illustrate the advantages of the system, because it is quite profound. I've looked, as I mentioned earlier, at all the different ways of doing it and was really confused. I've pretty much raised my hands up and I gave up. This is beyond my ability to rationally give a solid and confident answer until I encountered your test. Now I really believe strongly that this is really a near ideal way to make the assessment at this point in time, with the technology that we have today. Maybe give us a few illustrations, some good examples that would point out the benefits of this type of approach.

MN: Sure. One example would when people have a concurrent thyroid problem. We're looking at reproductive hormones and stress hormones. If you want to simplify it, boy hormones, girl hormones, and stress hormones. We're looking at all of those. If you're looking at cortisol, the cortisol in the thyroid really play into each other well. Having a good blood test for a comprehensive thyroid panel can be really helpful as well.

Let's take a particular example that I'm thinking of, someone who I knew well struggling with some depression, some anxiety. We test their cortisol. How do we do that? We can do it in saliva or we can do it in the DUTCH test. What do we find? Her results are high. We say, "AHA! We've got something here." The free cortisol is elevated. We know that there's more depression in people who have elevated free cortisol, so we draw this conclusion and we say, "You are 'making too much cortisol.'"

But then we look downstream, we look at those metabolites. What we noticed is they're actually low. We say, "Hold on, what's going on here is you have high free cortisol but the reason for that is largely because you have sluggish clearance of this cortisol." You make it but you're not getting rid of it. The liver's not processing it properly to get rid of that cortisol, so the free cortisol is high. But it's not because your adrenal glands are pumping out lots of cortisol. In fact, they're not pumping out that much cortisol at all.

What we find is that that specific pattern happens when your thyroid is low, or it can happen when your thyroid is low. That's well established in the literature. For a patient like that, as she deals with her thyroid issue, there's going to be a response on the cortisol side. What we can do incorrectly is we can go

chase that high cortisol and give people phosphatidylserine and all of these things to lower the cortisol. That's to lower your adrenal output of cortisol. But that's not her issue. Her issue is more nuanced and complex. When we look at all three dimensions of the cortisol, we get a fuller understanding.

Another example would be, let's just say, I'm trying to get a good handle on your dehydroepiandrosterone (DHEA). I'm going to measure your dehydroepiandrosterone sulfate (DHEAS) and it's low. What if you also have an inflammatory condition? Inflammation is a huge issue that a lot of people deal with. DHEA gets made by the adrenal gland. It gets turned into DHEAS, DHEA sulfate. That's a sulfation process. Sulfation is inhibited by inflammation. If I have low DHEAS, I could conclude that I have normal DHEA but the inflammation is blocking that, or I just don't make enough DHEA. How do you know?

In the urine test, you can look downstream from the DHEA in a different direction at these very abundant metabolites that well reflect the amount of DHEA that you're making. Now we get the fuller picture where we say, "AHA, you've got inflammation. It's blocking that sulfation, but you're actually making decent amounts of DHEA." Then we move on and see that inflammation also promotes estrogen production from androgens because it upregulates aromatase. We can see that picture.

But then are you clearing that estrogen? We can take a step further and look at that. Inflammation also is going to play into the cortisol in how it's metabolized very specifically. Again you need the metabolites of cortisol to look at that. This whole picture really start to emerge when you get this more nuanced, complex, and more comprehensive look at all of the hormones – the androgens and their metabolites, the estrogens and their metabolites, as well as cortisol – for this whole fuller picture to again just try to make better decisions and go in the right direction to try to help people with their situation.

JM: OK. Good. One of the most potent clinical interventions that I've encountered with respect to improving mitochondrial dysfunction is a strategy called intermittent fasting, where you essentially restrict your eating to a six- to eight-hour window. That window is variable, depending on actually glucose responses, which I describe in some future articles that I'm writing.

But the issue becomes, many people are concerned, especially for women or those with adrenal fatigue, that they should not be doing this. I don't believe that's the case for a variety of reasons we won't discuss here. But nevertheless, this issue of adrenal fatigue is quite common.

This is just one circumstance where it comes up. The way to discern whether that is really truly an issue is through a test like this, really probably the finest way to make that discernment and actually not only make that initial assessment but actually to monitor and follow the progress of whatever clinical intervention you're using.

Maybe you can discuss the evaluation of adrenal fatigue or adrenal hormone status because it is – let me preface this – enormously confusing prior to the introduction of your test, because there are so many different ways to do it. You almost have to take a course just to come away with a rudimentary understanding of what's going on. I'm sure you'll be able to simplify it and help us understand it in a few minutes.

MN: You can simplify, but I think it is important to concede that you are simplifying it, because cortisol, specifically is such a complex beast. You've got signaling going on in your brain at multiple levels and then you've got your adrenal output of cortisol. Really this message that we've had for a long time is that people that have low cortisol – take situations like post-traumatic stress disorder (PTSD) or chronic fatigue – we see the low cortisol, and then we jump and say, "OK, the adrenal glands are not producing as they should. Let's call that adrenal fatigue."

Really I think what the literature and the research is starting to show us is that for I'd say most situations, what's really going on has to do with the brain signaling and the stress response than the adrenal glands themselves. Are they really fatigued? Or is there some other issue going on?

That's really important as a group of healthcare providers or as a movement, that if you're treating the adrenal gland, or you're treating the entire hypothalamic–pituitary–adrenal (HPA) axis, what goes on in the brain as it signals the adrenal glands, that's really a different approach. It's important that the semantics of that that we continue to kind of move forward on that and figure out what's going on.

But one of the things that we found is that if I take a person who has low free cortisol, what we've thought really historically is that is "Stage 3 adrenal fatigue". That really I think is a misnomer. What we find is that, just at its most basic level, when you look at the metabolites of cortisol... Because you can't see that in saliva, you can't see that in blood, but it's the best marker for overall production of cortisol.

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MN: When you have these people who are, by this definition, stage 3 adrenal fatigue, about half of them or more are making more than average amounts of cortisol. They may be processing it more quickly. As in obesity, you get these huge productions of cortisol, but when you only focus on the free cortisol, you can call someone stage 3 adrenal fatigue who is literally making more cortisol than 90, 95, 99 percent of the population in some situations. So it's a more complex situation than that.

So when we want to define adrenal fatigue, we really have to start changing our language a little bit, and looking at the bigger picture of HPA axis dysfunction, because what mainstream medicine would say, this whole thing you can just wad up and throw in the trash, because there's no legitimacy to that. I think what we'll find is that there is common dysfunction here, and it leads to a lot of issues. The question is, is it really an adrenal issue or is it more of this whole system? As we go and try to fix people, what are we really trying to fix?

But again, with the lab testing, we really want to define what's going on with them well, and in some cases, they're making lots of cortisol. It's a more complex issue than just, "Hey, you're not making cortisol." So it's a really complex thing, and you just said can we simplify it.

JM: The other component to this is actually the timing. As you mentioned earlier, this sample is taken four times throughout the day. In the case of women, because we're evaluating their female hormones, and if they're menstruating, those follow certain cycles. There's very precise time of that menstrual cycle if you would take the test. It's a lot more difficult test to take if you're a woman, a menstruating woman, because there's only a few days in a month when you can take it, if you're looking at your female hormones, which is a wise strategy for most women.

MN: Yeah, if you want to look at your female hormones, then the idea is to collect, in a typical sample, between about day 19 and 22, which isn't too bad. You just have to pick one of those days, collect your sample, and then you're good. But it's worth the wait or whatever effort it takes to do that, because then you get to see and ask the question, "Am I making sufficient progesterone? Do I have too much estrogen? Not enough estrogen?" That's the window that we want to ask that question in.

If your only question is, "How's my cortisol production?," then you can test any day. You can test those four times, and you can get a really detailed look at how those hormones are doing.

JM: Speaking of hormones, I opened up our dialogue with the comment that it's a useful strategy if you're going to use bioidentical hormones. But in many cases, bioidentical hormones are inappropriate. There may be simpler strategies that one could implement to normalize the abnormal patterns that are found under your type of testing system, and your test goes in there very elegantly. So that's one useful strategy.

On the topic of bioidentical hormones, I think it's important for me to emphasize – I have in the past, but I haven't done it for a while – is that I believe, if you're going to use them, first of all, they should be bioidentical and natural. They should not be applied under the tongue. Through the skin, intradermally. At least – this is based on Jonathan Wright's experience – transmucosal. For anyone, that could be in rectal application or, for a woman, a vaginal application. That really is almost equivalent to an intravenous injection. You bypass the liver metabolites, which is a really profoundly useful strategy.

So if you're going to use them, bioidentical hormones, and in some cases, this is absolutely indicated, you would get a better idea of the need or requirement for that with your type of testing system. Why don't you comment on what I just said, and then also start to explain the very sophisticated, elegant, and easy-to-understand graphical representation of the analysis that you provide on this test?

It's not just you get this list, written list... I mean, you get a written list, but you get a colored, graphic representation of what those results mean, and it's relatively easy to understand. It takes a while to look at and read it, but it's understandable to most people.

MN: Yeah. You're sort of marching through a number of the challenges you've experienced with hormones that I've spent like a decade trying to overcome. That is bioidentical hormones. If you need them and you take them, how then shall you monitor them? It's a tricky question because if you look at like...

Dr. Wright's done a lot of really good work on, OK, how shall we best give this? If you then concede and say, "OK, a mucosal membrane's a great way to take up the hormone because it's a lot clearer what's going on and you're getting better uptake than, say, some of these other issues, and you're bypassing the liver. OK.

So then we say, "Well, how do I monitor them? In blood, I'm going to get an up and down pattern, but gosh, I don't really know when the up is and when the down is." I can show you, for example, results from a study that was published, where they looked at two women. Vaginal hormones. The peak on one woman was at eight hours. The second woman, taking the same thing, had a peak at two to three hours, and she was at baseline at eight hours. If you tested eight hours, does she need more hormone? Or did I just miss the peak? It's hard to know.

Here's where urine testing enters. We're going to collect over time. That's an improvement. But then you still have this issue of, "If I put testosterone in an area where my sample's coming from, and the amount of hormone in that supplement is literally a million times higher than what's in a biological sample, I could contaminate it."

That's where we spent months trying to come up with a creative solution to this, and we did. We said, "Look, I don't test testosterone in urine." In urine, it's in a different form. It's what we call a conjugate.

It's testosterone glucuronide or testosterone sulfate. If it's there as just testosterone, it's not supposed to be there. That would be a contamination.

We just created a special method that would remove and separate these different types of hormones to give you an average over time (because urine is better for that), and a non-contaminated sample to give us a better option to monitor the hormones, because monitoring the hormones can be tricky business. You really have to ask the question, "Which test is best?" Differently, for each route of administration.

Oral hormones are different. Most people don't like oral hormones, except maybe with progesterone. But if you put it on the skin, you put it on the mucosal membrane, the lab testing or questions change a lot.

On our website, we've got a little matrix that people can download and just pick what you're doing and it'll go through, "Hey, here's what serum testing has to say." Because sometimes, serum testing works perfectly fine. If I've got an estrogen patch, serum testing works great. But sometimes, it doesn't work very well. There can be some challenges there.

As it relates to the report, that again is a challenge of... Look, if I've got all these metabolites, and some of them, there's some complex and new ones here, and I just give you a list and some numbers, that's not very helpful. We don't want to spend hours digging through what these all mean. So we do two things.

One, we present it in a graphical way so that you can see it in that flow of, "Here's my estradiol. That's the estrogen maybe I took. Here are the three different pathways that it can go down, and we can look at which pathway is preferred. Am I methylating well? Do I need to start thinking about some genetic defects in my methylations?" and which can get you off on some other topics.

The other thing we do is, what I've realized is, patient or provider alike, that still isn't enough sometimes, so we've embedded right on the front page of our report some tutorials to just walk people through each section of the report to say, "OK, I think I got this, but this cortisol thing is blowing my mind." Watch the video. We've got a whole series of tutorials that can help you figure out, either as a provider, how to make sense of it, or as a patient to figure out, "Where's my dysfunction, so that I can target maybe a provider specifically who has experience in adrenal dysfunction or female issues as it relates to estrogen or progesterone?"

Yeah, it's really important when you get into a complex test like this that the reports tell a story, so that we can all figure out what areas we should be focusing on in terms of taking corrective action.

JM: Sure. One of the mottos of our site and the content that we provide is to "Take control of your health." This is a type of the test where you can do that, because the format of the report, the colored (I think you mentioned it was colored, which makes it much easier to interpret) graphics really help you follow this complex progression of the hormones. How long have you done this test? At least five to 10 years? Somewhere in that range, right?

MN: I think I've been building it for 10+ years, and we've been offering it commercially for about four years.

JM: OK. Right. And I was in under... I definitely started using it before you offered it commercially.

MN: You were tested first before it was commercially available That's right.

JM: I'm not saying that to brag, just to comment on the progression of your report, which has really improved quite dramatically over the years. You've really refined it. It's easy to understand.

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A relatively literate consumer patient can take this report, read it and understand it. The interpretation and understanding can be aided by the magnificent video tutorials that you provided on your site to help you go through the process. You can start from zero. You essentially get a free course on how to interpret your hormone test, which you don't have to pay extra for. It's all there. It's free.

It's really a great and powerful tool, and just my commendation for really developing this useful tool to help understand what's going on with their hormones, because prior to this, it was really confusing and complex.

MN: Yeah, thanks. It's really evolved, and it continues to evolve. We want to give people obviously the best information, but also to make it as palatable as possible for both patients and providers, so, again, you can identify which issues need to be looked at and pursued, and to know when there is something at the level that you need to go to a healthcare provider and really get some intervention to identify what the problem is and to start making some improvements.

JM: Yeah. So are there are conditions or clinical settings where the DUTCH test might not be appropriate?

MN: I think anyone who's selling lab tests tries to be all things to all people. There are some scenarios where every test falls short. So you talked about bioidentical hormones, right? If you want to take a hormone, test a hormone, and then change the treatment based on the testing, in terms of dosing, there are a couple of scenarios where a urine test doesn't work as well.

Taking sublingual hormones, which you're not a big fan of – and I can understand the drawback to that, some providers like that. The problem is, when you swallow hormones, you get a lot of metabolites in the urine, and it really makes the interpretation difficult. Sublingual's even more difficult because you're only swallowing part of it, and I don't know which part. Some people swallow 20 percent, some people swallow 80 percent, and that's part of the drawback. You don't want to be taking them orally, but you kind of are, anyway, even if you're being careful. It really makes for a difficult interpretation.

I cannot look at a woman on sublingual testosterone and say, "Your dose is right. Your dose is wrong." I have no idea. With the estrogen, it's the same thing. I can look at your metabolism and see some of these metabolites we think are more cancer-friendly, and some are more problematic. We can look at those patterns; that's good. But I can't really help you with your dosing because sublingual hormones are not just a good match for urine testing in terms of trying to adjust the dosing.

Our test, because of the way it works... I don't want to get into too many specifics. But if you've got a kidney issue, a test that's based on spot urine testing is probably not the best option. You'll probably be better off going in a different situation.

We don't have reference ranges for kids. The model is actually beautiful for children, because you can actually do it. I've tested my own kids. But we don't have appropriate ranges for children. Those are kind of some of the situations. Kidney issues, and just some hormone situations.

JM: For kidney issues, are you referring to renal insufficiency, where your kidneys aren't functioning properly?

MN: Yes.

JM: OK. So what type of creatinine levels are you referring to? Above 1.4, 1.5, 1.6, over 2?

MN: You know, I think if they're outside of really just what's normal for that, it's probably a different... a different direction is probably best, and the reason for that isn't as it seems. It's not because of how necessarily the hormones get into the urine, but in a spot urine test, there's something we measure called creatinine, which helps to correct for hydration. The test is based on the assumption that your creatinine is normal, which you need normal kidney function for that. What you get is that the results would essentially be just shifted by whatever's off in that creatinine. It's an issue if you have a kidney problem.

We haven't had a handful of patients where we said, "You know what, you probably need to go in a different direction. Here's your money back. This is probably not going to work for you in terms of being as accurate as it needs to be because of that issue." So it's not usually an issue, but if you know you have a serious kidney dysfunction, it's probably not the best test.

JM: OK. Great. There might be some confusion from some people who are watching this, who understand that urine is a waste product. So how are the hormones that are secreted, metabolized, and excreted to the kidneys going to have some relevance to what's happening in the blood or the tissues? Maybe you can follow that line of reasoning and help people understand why it's still useful.

MN: Yeah. Let's take one hormone, just as an example. Let's say, estrogen. We're calling it estradiol, that's our main estrogen, but let's call it estrogen. So if I've got estrogen in my blood, how then does it get into the urine? What happens is, in the blood, I've got the total hormone. Most of it is bound to a binding protein. It can't get into the cell. It's just being carried around.

Then a fraction of that hormone, which we really think of as the most important fraction, is the fraction that's free and "bioavailable" to get in and do something. That's the same fraction that's available for Phase 2 metabolism, conjugation, some of these big words, that lead it basically be in a form that you can excrete it in urine. What ends up happening is that urine ends up being a pretty good reflection of your bioavailable hormones. When we do studies... because we're constantly doing clinical validation studies. I'm a cynic when it comes to lab work. I want to know that this is what we think it is.

What we've done, for example, is we've taken women – post-menopausal women, pre-menopausal women – throughout their entire cycles. So we've got super low values, we've got normal values, if you catch them at ovulation, we get these really, really big values. We get blood, we get saliva, and we get urine testing. We do correlation studies. We find that, for those hormones like estrogen, the correlation to what's going on in your blood is really quite good.

Yes, it's a waste product, but it's a reflection of what's going on at a meaningful level in your tissue. That's a good question to ask. The validation data needs to be there, and it is. That's pretty well-established in the literature as well, that those numbers track pretty well what's going on.

What we've found, and one of the major advantages that I find with this test as it compares to saliva testing is specifically for those estrogens, is people really like the context of saliva because it's free hormone. The concept of free hormone says, "You know, it's probably better because it's 'bioavailable.'"

But what we find is because there's so little there – there's a thousand times more estrogen in your urine than in your saliva – when you just very practically... because we did this in this study. We sent this to like seven different saliva labs. We said, "OK, we've got this group of low women." These are 65-year-old women, not taking hormones. We know they're low. And then different phases of the cycle, ending in ovulation, where it's really big.

What we found is in the blood, we got this nice stair step: the lows, the early part of the cycle where they're a little higher, the later part of the cycle where they're higher yet, and then at ovulation, you get these four steps. In urine, you get those same four steps. When we look in saliva, they all kind of get squished together. Even though it's free hormone, it's just so hard to measure that the accuracy is really better, for reproductive hormones, in blood or urine testing. But that data needs to line up. We've done a lot of studies to show that the serum and the urine, they tell a really similar story for those reproductive hormones.

JM: Great. Is it possible for anyone to order this test by themselves, or does it require a healthcare or licensed clinician or practitioner to order for them?

MN: We would prefer that people work with their healthcare provider. When they've got issues on hormone testing, that's really the preferred way to go. The hormone test that we sell can be ordered on our website, and then we have a medical director on staff who can handle the official ordering of it. It's not available in New York, but in most states, we can do that. They can go right to the website and order the test there.

There's what we call the DUTCH Complete. That's the whole thing: estrogen, androgens, metabolites, melatonin, cortisol, and all that. The only other version is called Cycle Mapping. That's more like, "I'm dealing with a fertility issue," or "My cycle's just so wacky, as a premenopausal woman, that I really want to map this thing out." It's a little more extensive, it's a little more expensive, but you get this really expansive data of everything we just talked about, plus this tracking of the female hormones throughout the cycle to see where this issue is. What's going on with the estrogen and progesterone?

So the DUTCH Complete and the Cycle Mapping are the two options that people can go and get.

JM: Great. What is the name of the website where people can go to look at this?

MN: It's DUTCHTest.com. D-U-T-C-H. DutchTest.com. People can go on there and there's a lot of video content if you want to just kind of look through. How does this test compare to saliva? How does this test compare to blood? Where are its proper uses? Where are its limitations?

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We've kind of broken that down for people. As well as, now that I'm done with the test, how in the world do I interpret it in terms of this information and that information? There's a lot of content there that people can spend some time geeking out. If you really like your biochemistry and you're trying to figure out what's going on with your hormones, that can be helpful in trying to figure out what the issue is in a particular case.

JM: Yes, indeed. That's probably one of the most important components and the best benefits of your approach, these comprehensive tools for interpretation of the results. What is the cost of the complete DUTCH testing that most people will order?

MN: The test on the website is \$399, for the DUTCH Complete. Just for a point of comparison, if you look at the Medicare value of this... OK, we say we test this, and then Medicare says you should bill it with that, if you add those numbers up, it's about \$800. Some lab tests, if they bill insurance, it usually takes about twice that number, sometimes three times that number. So we're working hard because this is a sophisticated test using lots of different instrumentation. But we're trying as hard as we can to keep it cost effective.

For the Mercola listeners, we can put a \$50 discount on there, if you just put in a coupon code of your last name, MERCOLA. We can knock that down another \$50 dollars to make it a little bit more cost effective for your listeners, to try and get in there and get a test to see what's going on with your hormones.

JM: Is there ever a third-party reimbursement for that, from insurance carriers?

MN: You'd really have to order it from your doctor. Go to your doctor and say, "Hey, Doctor, I want to order this test." Get a prescription from your doctor. The logistics of it would be a little bit different that way. However, when you do that, what we found – and this is why we're taking this approach – is they tend to cover about 60 to 65 percent (sometimes as high as 90 percent, but on average, probably 60 to 65 percent). So if you go other routes, you can pay \$400 or \$500 cash for a test like that, or they can bill insurance \$2,000, sometimes \$3,000.

But if you can get it ordered through a healthcare provider, we can give you an insurance receipt, and you can try to get a reimbursement. Again, if you're average, you'll get a pretty good chunk of change back, and then it becomes a real cost-effective option.

JM: Yeah. That's a great test or strategy. Are there any other points you'd like to emphasize, bring out or review? Because there's a lot of information here, so I may have skipped over some.

MN: I think it's one topic at a time. You kind of really have to really break it down. Again, if you're on bioidentical hormones, you got to ask yourself, "What am I taking? How am I taking it? What's the best test?" We want people using this test when it's most appropriate for them.

If you're on birth control, you're going to get less information on progesterone because your birth control is going to kill your progesterone production. In a situation like that, you're going to get predictable information for progesterone and estrogen, so there's a little bit less value. But there's still all this information on the androgens, cortisol, and all of this. That's really in the website, where we try to break down a lot of the topics so people can help make decisions and do the testing when it's most beneficial for somebody.

But in most situations, because we're looking at some many things, you tend to find some things that you can look at and chase down with the help of your healthcare provider, or just independently figure out what sort of things are actionable.

JM: Terrific. Well, thanks for sharing your insights. The DUTCH test is the one I use personally for myself, friends and family, if I'm going to be looking at my hormone levels or their hormone levels. It's clearly the one I recommend. You would get this test, the complete DUTCH test, which is a \$50 coupon off, I guess, if you type in MERCOLA, which is very generous of you. I didn't realize you were going to make that offer today. This is not planned.

I highly recommend it. It's DUTCHTest.com. Just like it sounds: D-U-T-C-H-Test.com. I think you won't be disappointed.

[END]