Introduction to thyroid and fertility

Welcome. Dr. C, I'm so excited to have you here today for the Beyond Infertility Summit. We're going to talk all things thyroid and you have probably some of the most researched backed information when it comes to the thyroid.

So I'm very excited to pick your brain today about what are the new findings about the causes of thyroid disease and how do they connect to fertility?

Happy to be here. It's super cool doing the summit. I'm glad to be a part of this and yeah, excited to have a talk with you. Awesome. Awesome. So let's get into it.

What is what are some new things that you're finding about thyroid disease and how this could be impacting our health overall health and fertility health?

Well, it's more common than we thought, you know, and more prevalence and the rates have been on the increase. And thyroid disease, which take a step back, we're thinking about a couple of different facets of it.

So we've got this little gland, it regulates other hormones. You know, that's one big fertility tie in and also controls how well we make energy, how well we can burn weight and repair our skin, hair and nails.

And there can be problems with it. It can make too much hormone, too little, or it can be attacked by the immune system. And all these things can affect your health and have big consequences with fertility.

Yeah. Yeah. So let's get into those things like hypo, hyper and autoimmune. And those are the three things that you just laid out for us. So what do they actually mean?

And I think there's a lot of confusion as like hypo means that TSH went up I can imagine like it's so confusing for so many people.

Autoimmune thyroid disease and fertility impact

So let's just break that down. You know, listeners, if you get one thing from my whole Talk, this is it. The autoimmune side of thyroid disease can hurt your fertility regardless of anything else.

You can have perfectly healthy thyroid function, but if you've got thyroid autoimmunity, that can shut down your fertility efforts. That's the big takeaway and that's the most common early finding.

This can go on for a decade before there's any other problems at all. Yeah. So the autoimmune component that's like the immune system is kind of overly activated and is attacking our thyroid gland.

Yeah, that's a weird thing. So we've now come to realize that autoimmunity is a normal, healthy mechanism to some degree and in some circumstances. So each part of our body is a collection of different cells.

You know, the thyroid cells are different from the liver cells, from our cells, and each individual cell isn't around all that long. You know, several months and it dies.

And new ones that are fresh and ready to go take its place. Now, clearing out the old cells is done by many different mechanisms, but one of them is autoimmunity.

So the immune system targets old cells and kills them, makes them go away. That's great. But it can get out of

control and the body can attack cells that shouldn't be attacked, that are healthy and should be sticking around ones that we need.

And if that's too bad, it can damage so many cells that it can make the gland not work properly. Hmm. Yeah. That sounds a little bit problematic if our cells are not working properly.

So am I understand this correctly. If the immune system is clearing out these, like, kind of dead cells, if they don't get cleared out, then what happens?

Well, if you couldn't destroy the old cells, you couldn't really have the capacity to build new ones. Now you use some of the same building blocks, the same location, thyroid cells form little nurseries called follicles, and they make the active hormone.

And if all of dead cells remain behind, the follicles can't function properly as a unit. And also, if they didn't get replaced, eventually you would just have all all dead cells.

You know, you would have this atrophy of the gland. So it's a necessary response, but some around a quarter or a third of the population can have some degree of measurable thyroid autoimmunity.

It's not always relevant, but if it is relevant, it can be a big driver for many facets of health, even without there being other versions of thyroid disease.

Mm hmm. Yeah. And we see this a lot like antibody to the thyroid will show up on lab tests in people that have completely, quote, unquote, normal lab as far as TSH, t3 t4.

Yeah, definitely. And, and that's it's a weird thing, but the, the way in which that autoimmunity can affect the health has a lot of things to do with the body besides just the thyroid.

And part of it is that there's ways in which these same antibodies affect other parts of your body. The other thing is that the underlying problems that give rise to these antibodies affect your health in other ways.

So those are those are both true. And we know that when someone has thyroid autoimmunity, they're at greater risk for infertility. If they do get pregnant, they've got a greater risk for autism among their children.

We also know that heart disease is more prob, more problematic, greater risks for certain cancers, and a long list of common symptoms can show up from not.

And so with the autoimmunity, let's talk first about the impact of fertility. So what in what way is the autoimmune thyroid condition affecting what's happening maybe at the ovaries or the uterus level that is going to play a role in whether or not someone gets pregnant, stays pregnant and or has a healthy baby?

Well, yeah, there's how it happens. And if it happens and there's theories about what goes on at a molecular level, we think it may involve the activity, the antibodies and the whole implantation process, uterine lining, receptivity.

That's not definitive.

Iodine, genetics, and thyroid dysfunction

But we do know from so many big studies that if you look at groups of women that have elevated thyroid antibodies, there are risks of early miscarriage or inability to conceive are just much higher than those who don't have that.

Yeah. So is it like I what? I don't want to say normal, but is it important? That's a better phrase. That is important for anyone who is trying to get pregnant to have these tests as a preliminary baseline, even if they were told that their thyroid is normal.

You know it's a cool thing there's so many facets in health that often don't get looked at and that that's why doctors like yourself have a place that those that have already tried things, they can have very real problems that many of the doctors haven't thought of.

And this is one of many things that you cover and you'll talk about in this conference. But yeah, this is one topic in which someone can seem perfectly healthy, but it's a real problem and it can shut down fertility.

Yeah, yeah, absolutely. So what are some of the underlying things that are happening when people have thyroid disease, autoimmune thyroid disease? What's going on under the surface?

Yeah. So thyroid disease. I talked about the autoimmune side. That's like the inflammatory response. Then there's how much hormone is being made and there could be too little or too much.

The amount of thyroid hormone we need is just really, really exacting. I, I did some math one time. If you think about an Olympic sized pool and you were to drop a teaspoon of vanilla extract in an Olympic sized pool.

That's about the concentration of thyroid hormones in the human bloodstream. Now, if you had half a teaspoon or a tablespoon, that could be lethal in the Olympic pool.

Yeah. Yeah. So it's super well controlled and there's many, many ways that regulate it. So therefore, a lot of opportunities that can go wrong. Ultimately, this is a genetic disease, so it's something that can show up in families.

Brief aside, genetic doesn't always mean your family has it. You know, half of our genes come from our parents. The other half are random. So things can be genetic even if they're not present among their family members.

But that's largely a genetic disease. But it impacts genes that regulate iodine metabolism. So our thyroid needs a certain amount of it to be healthy, you know, not too little, not too much.

And we never get the exact right amount. So we have ways to buffer that, to hold on to it if we're not getting a lot or to get rid of it if we're getting too little.

Some people don't buffer as well as others. That's mostly based on these genetic differences. And if they can't keep that number right, it gets out. And that's the biggest single controllable driver.

Hmm. Okay. So iodine is one of the main drivers, is what I'm hearing. Yeah. So genetics, which encompasses gender and gender, go together and then age.

And these are things that are big known factors that the longer we live, the more likely this is to happen. But they're not controllable factors. They're not things we can really turn flip the switch the other way again.

But I don't it's kind of cool because it's a large known driver, but it's also a controllable factor. We can flip the switch back and that can be useful. Hmm.

Okay. I love that do. So in your opinion, is it possible to reverse thyroid disease or do we have it and we have it. On most forms of it? For most people, the clear evidence is, yes, that the vast majority, if they can get into a certain window of iodine that lets things heal.

Most can see it radically improved and many can see it completely reverse. And this is talking about the autoimmune side of the disease which generally precedes the plan changing in function.

And for many it also talks about the gland functioning normally again. Hmm. Mm hmm. And so how do we know if we're in the right range of iodine? Well, if you're getting thyroid disease, you're probably not.

This is a tricky thing. So if we were in a perfectly logical, simple world, you could just measure it out and it's not really a matter of how much you can sell compared to everyone else.

It's how your body responds to what you're consuming. Yeah, there are amounts that could be too high or too low for anyone that's not as common. It's more common that people have individual intolerances to where they're getting amounts that are not that unusual, but they don't tolerate it.

And the strongest signs of that are the development of autoimmune thyroid disease and its consequences. So if someone does have that, that's a reasonable thing to suppose.

Interesting. So in in what you've found and like you've worked with thousands of people, your experience is that when people have autoimmune conditions, it's really their body saying that they're not tolerating the iodine, that they're consuming in whatever way.

And I know we're going to get into which ways are we consuming. I'm sure in the context of now the modern world and adults and autoimmune thyroid disease.

That's almost always the case. And the that antibodies we think about are two things. There's thyroid peroxidase antibodies against that. That's an enzyme.

And that enzyme is oxidizing iodine. So it's activating inactive iodide into more active iodine. And when it does that, that active iodine attaches onto a carrier protein called thyroid globulin.

Halides, environmental exposures, and iodine balance

When that gets too full of iodine, it creates free radical damage. We then attack it. So the other main antibody is anti thyroid globulin. So these are the main elements of iodine metabolism.

And if we have too much there items, a big source of free radicals, like hydrogen peroxide, like bleach, it's a sanitizer. That's why it kills things on contact.

But too much in the wrong places. It also creates oxidative stress there and initiates the immune response. Hmm. Okay. That makes a lot of sense. So iodine is then a big factor.

What about. I've heard this theory of, like, other halide, like bromide or fluoride, all the ige that can kind of like displaced iodine off of these molecules are compounds and are kind of like taking the plates and making these hormones nonfunctional.

What's your sense of that and how much of that does it play or how much of a role or how much of a concern is this for people that are struggling with thyroid disease?

Yeah. So there's a mechanistic idea about what you just illustrated, and there's a point where anything can become toxic. Too much of anything is a bad thing.

But I guess the question is how common is this in the everyday world and in the routine amounts of exposure to these compounds? How often is that a driver of thyroid disease?

So fluoride first one, we have fluoride added to municipal water in many areas. We have that in dental type products. And in the distant past we didn't have medications to slow the thyroid when it was overactive.

So historically, high dose fluoride has been used to slow the thyroid and totally high amounts of it can do that. That's somewhere above 30 to 50 milligrams per day.

We've seen big data sets in populations that have fluoridated municipal water compared to those that don't. And that context, the amounts there don't correlate with changes in thyroid disease.

There's some areas rarely to where the naturally occurring water supply geologically has massive amounts of fluoride, much higher than is added into water, much higher than is naturally occurring in foods that does subtly

cause a measurable increase in thyroid disease.

We know that fluoride is occurring in tons of natural foods. It's in dental care and toothpaste and whatnot. Barring eating about a tube of toothpaste per day, the amounts are exposed to there aren't enough to be a big factor.

Other not even over time though. No chloride chlorine. The chlorine gas is toxic when we're void that otherwise not a big known factor. We know that it can also be an irritant to the lungs, not a noticeable driver of thyroid disease bromides.

There's an amount that's high enough that can be a problem, but that's also like fluoride kind of above the typical range. So yeah, they can be toxic and they recently FDA is considering banning brominated vegetable oil from foods we still have.

That is a flavor enhancer in a few types of soft drinks. But there was actually a study done in which bromide in ranges above what's found in foods was given in supplemental forms to those with thyroid disease that closely tracked.

They did varying dosages up to ten milligrams per day, and the highest doses had no adverse effects upon thyroid antibodies. Thyroid scores. This is a funny thing, but we now know that bromine is an essential mineral.

It's been recently recategorized. Our body requires it for certain functions. So yeah, these are things that are in our environment. Whopping amounts can be bad, but they're just not common drivers of thyroid disease in the amounts we're used to be exposed to.

Hmm. Well, bromine is a is a sexual. Element. Essential element processing. That's like basement membrane metabolism. Our bodies are quiet. It's so common in the food supplies that is not the kind of thing that you come across deficiencies of.

But we now know that the bodies require it. Wow. Wow. That's fascinating. I keep I always learn something, especially when I talk to you. So I love OC. So in terms of iodine then since we talked about like all the other possibilities, it sounds like iodine in the right dose is good.

Medicine in the wrong dose is not so good. So how do we determine and I think you said like different people may have different responses if you're if you have some level of thyroid disease or dysfunction, your the level of iodine that you're getting is probably not good for your body.

Is that correct? Yeah. So and the thing with it too, it's in all foods, you know, we can't get none. So the rare cases too, where populations have a very limited food supply, they have one or two foods in which almost all their calories come from out, and those foods are only grown in the same soils that are lacking in iodine.

Those are cases that did set the stage for iodine deficiency. Those those have been there are now no nations on the earth that are categorized as severely iodine deficient.

We have a handful categorized as moderate deficient, but those cases have lower rates of adult thyroid disease. You know, they have higher rates of some versions of pediatric goiter.

But even there, there's lower rates of adult thyroid disease. So yeah, so too little is not really a big concern for people. We've had seven documented cases of deficiency in the United States since 1980. So very rare and unusual.

And with thyroid disease, the main thing is the main risk is just there being too much. So the trick is to eat a lot of healthy foods that are good and of have basal amount of iodine but avoid the ones that have extremely high amounts. Mm.

So what are the sources of the high or excess amounts of iodine? It's kind of interesting. There's two categories

that have changed the most in the last several decades, and that's processed grains and dairy foods.

So things that don't really have it naturally occurring but have it added in throughout the whole food manufacturing process. And the amount in those foods has roughly doubled or tripled in the last several decades.

Food sources of excess iodine

And those are foods people eat more of now, too. So for a couple of reasons, they're the thing is pushed it up over there the most. When someone's out to reverse thyroid disease, they want to get to a lower, narrower window.

And when someone is simply seeking to prevent it, they've got a broader leeway. So when someone wants to actually reverse it, they want to think about avoiding those processed grains, the dairy foods during that reversal process.

Other sources that can have moderate amounts that can be problematic during that stage would include egg yolks, some types of ocean based seafood, seaweed, salt that has added or naturally occurring iodine.

And those are those are the prime sources. So in terms of like general health, the ones to be careful with, I didn't hear you say avoid particularly but to be careful with are the the process grains and dairy.

Yeah. During a time of trying to reverse thyroid disease, you want to avoid those. What if your thyroid function is stable or you're you've reversed it before, then you've got tolerance of about a serving or two per day of moderate iodine foods.

And how do like this sounds like a very basic question, but in my mind I'm like, well, how do I know if my grains have iodine now? So grains, to be really precise, if you're buying like a bag of brown rice, they don't we're talking like a bag of flour.

You can cook it at home. It doesn't. But things you buy pre-made at the store. That's a good question. And there are some things that will say, you know, this has I do a conditioner that's somewhere on the ingredient list.

And some of the researchers who look at this topic have bought products that you arrive with at the store and then categorize them by those that are labeled with ice dough conditioners and those that are not.

And it's not a predictor of their iodine status. So it's something I've come to realize is that, you know, we think about reading ingredient lists. How do we process foods?

Everything there is not on the ingredient list. And that's that's not a secret anymore. So a lot of things are not even listed. And that this is one of them. Right.

That's it's I mean, it's a little concerning when it comes to our food, if it's not on the label. Super sorry, super brief aside for a while, a long time ago, my dad worked in a plant that received grain and processed out and made it to a flour.

It was a large mill was in that very border between Minnesota and Canada and the people that work there. This was back in the seventies. They weren't granola people who are fussy about what they ate.

They wouldn't eat commercial bread products. They knew the number of chemicals and toxic compounds that they exposed grains to as they're being made into flour that never made it onto labeling.

So there's a lot of reasons to avoid processed food, even beside some of the labels is enough. But there's there's more pieces of that. Right? Yeah. So it sounds like even in the processing process, there are things that are being added in that don't even have to get on the label because it's a part of the processing.

Brains are soaked in formaldehyde before they get into flour. You know, God would. Not. Approve. Oh, I did that.

That's not part of the baking process.

So it's not on the label. Yeah. So essentially, like if we're trying to stay away from these, then we need to buy the whole grain form of whatever it is.

If you want rice or brown rice, buy brown rice, turn it into flour yourself. Don't honestly. I love whole grains over processed grains for 25 other reasons or more.

But in the case of I mean, even if you're buying flour products, that's that's different. So flour in commercial baking is not the same as flour for home baking.

There's a big difference that way. Okay. Okay. Wow. So many things. I had a feeling that you were going to say seaweed, which was on your list of high iodine foods.

If during that phase that you're trying to like heal and kind of comeback from thyroid disease. I'm curious if there are the parts of the world that eat lots of seaweed as part of their culture.

Is there any different than other parts of the world where we're we're not used to it or we're not meant to be eating so much of these products? Yeah.

So they have higher rates of thyroid disease and thyroid cancer. There's a strong correlation that. Right. Okay. Okay. So the idea. Is Hashimoto's disease was discovered by a Japanese doctor.

Let's see. Yeah. Okay. Fair enough. I just don't like and that's very interesting because it's my own bias. I can see that now. But like generally speaking, you don't see a lot of hypothyroid, ethnic bodies of Japanese people, right?

They're generally like petite and skinny and like kind of skin or balding, cute, but autoimmune looks very different than hypo thyroid. Well, hypothyroidism doesn't always cause we can do that.

So that's very culturally correct. Yeah. Yeah. There's a lot of symptoms and risks that it causes. Same thing with thyroid cancer. They got the highest rates of thyroid cancer they have for quite some time.

But. But, yeah, that weight gain is not always a variable. Wow. Wow. Okay, so are there any tests that we could be doing for iodine? Because that's always a question why testing.

Tests we can be doing, but with a test, the question is what question tend to answer. If the question to answer is, is this the cause of thyroid disease?

For me, there's no good test for that because it's not just a total amount in your body, it's how your body's responding to it. Now. The one useful time and useful way to test is if someone has gone low iodine and they've failed to see a helpful response.

In that case, there's a therapeutic window. So it's not that you get to a certain point that causes disease, but you've got to get to a certain level to have a chance of reversing disease.

Testing thyroid function and iodine status

So if you're still excreting a lot of iodine, you wouldn't be at a place where low iodine diet might help you, right? So if you're already on a low tide diet, you still have a high amount of iodine you're excreting either you've not avoided all the obvious sources or you need more time because there is so much in your system.

So after the fact, if someone's not improving, that's time. It can be useful. So basically they're urine tests of how much iodine you're excreting. And even if you've limited intake, if you're still excreting, that means your body isn't in that like optimal range where healing is going to happen for your thyroid.

Yeah. Blood levels of I don't need nothing. I won't spend a lot of time on that, but they just mean nothing in levels B nothing urinary levels. They can be skewed by how active your kidneys are at that moment.

So be really precise. There's a test called a urinary iodine to crowning ratio and the therapeutic window's below 100 micrograms of iodine per gram of crap.

So if someone says happened busting my butt the last three months I've been doing this thyroid reset diet. I've not got any better tool you check your urinary I tend to crowning ratio if you're above 100, there are some sources you missed or your body needs more time and some people who are taking things like iodine supplements or really high amounts in their diet, they might need a fair amount of time.

I just talked to someone last week who was consuming iodine supplements for some time, developed hypothyroidism from that was hospitalized for it. And now we're about, I think, three months after she stopped, she's been in other areas that died or thyroid function is just about totally stable.

She's feeling fine, but her iodine output is still ten times above the target like, okay, cool. You've got to keep that. That's, you know, you're not you're feeling better.

That's great. But your body had so much it's not yet got rid of that backlog. So that that's the one context in which it's helpful. Wow. So is it sounds like it could potentially take a long time to excrete the stores of iodine that the body creates?

Well, no. In most cases, when someone is responding badly to usual amounts, say they had a few hundred micrograms more than they tolerated. They can usually clear that in just a few weeks of being in a low range, but some people were exposed to amounts that were so high.

And this is the tragic thing. So there's iodine in supplements and this can be a huge problem for those prone to thyroid disease. The amounts in supplements can commonly be thousands of times above what's safe, no exaggeration.

And if they're doing that daily for months on end, yeah, they might need a year or more to clear all about. Yeah. Yeah. And I think I've heard you say before that iodine is one of these things that is sometimes in supplements in higher quantities than even what's on the label.

Yeah, that's a problem to the amounts. It's a hard thing to keep stable chemically, and the amounts are never what they say labeled sometimes quite a bit more.

And even with that though, some things are labeled saying that just the label amount is already just horrible. It's so what? Like I'm curious, what is an optimal level on a supplement?

Let's say you take a multivitamin. What is an acceptable amount of iodine in a multivitamin? That is for a person that's not dealing with thyroid disease.

Well, so here's the thing. So we think about average intake and average intake in America is about 180 micrograms per day. Now, averages can be very deceiving.

You people could be quite a bit above or below that. So we think about the requirements and the range in which people who are genetically prone to thyroid disease are the least apt to get problems is between about 50 and 200 micrograms.

So if the average intake is about 180, most of population at the upper end about average. And now if you're adding anything on top of that, you're above that window.

So so yeah, having any in supplements can be a problem for those prone to thyroid disease. And is the best way to predict it. Or like at least be aware of it is like one of my parents had thyroid disease or my aunt has thyroid

disease.

Is that enough to just put it on people's radars of like, hey, this applies to you potentially? Well, I guess they're saying, you know, you have a problem and you might have a problem.

I, I don't have a family history of thyroid disease. I don't have it. But I'm not going to go swimming. I'm not going to push it. I don't want to find out that, oh, now I've got diabetes.

So now I just, you know, because that's definitely what you know for sure. So I'd rather play it safe and not go outside. So what is your range and how where do you think where do you feel comfortable having your iodine intake be?

Well, it's a tough thing to measure. Be accurate with, but I avoid the high sources. You know, in the thyroid research, I made it simple. I broke foods down into green light, yellow light and red light.

So green light foods are rarely going to be much above ten micrograms per serving, pretty much safe for all people with unlimited amounts. Yellow light foods are like 10 to 50 micrograms, and if someone's stable enough, they can do fine on a serving or two of those things per day.

Red light foods are often way above 50 micrograms, and someone from the thyroid disease, those could be a problem. So I don't do those red light foods often.

You know, I'll do a couple of electrodes a day here and there most days, but I wouldn't do a lot of them on a given day. Okay, so you're pretty diligent about staying on top of it, but that so there is I'm curious what you're going to say about this.

And and it's okay if you're like I don't know. The recommendation for pregnant women for iodine is 190 micrograms per day. Is this a good idea, a bad idea?

Like if you were making your prenatal, would you put that level into a prenatal knowing that the general population believes that this is still true? And like and you know what, you know, in terms of like we're not accommodating for all the foods that actually already have iodide.

Right. That's it. That's the thing. There have been the Cochrane Medical Review Board did a review in the last couple of years about the rule of 18 supplements in pregnancy.

And conclusively they stated that there's no benefit to mother's health. There's no benefit to baby's health in terms of general health or thyroid disease.

In either case, there is a higher rate of morning sickness, there is a higher rate of elevated thyroid antibodies in mom, but there's no net benefit. And. Yeah, that's been pretty conclusively stated.

So wow. Okay, I'm going to have to look up the study. I'm curious because the like it's it's not normal, but it's definitely super common that women develop antibodies to their thyroid during pregnancy.

Right. The more I don't consume, the more of a risk that is for them. Yeah. And is that like is that the driver that's causing all of these women to have potentially have Hashimoto's.

Or quite simply, I don't need prenatal is one of the factors behind that. Wow. Wow. Okay. That's a really interesting thing. And like almost impossible to find an iodine free prenatal I don't think it exists. Yeah.

So thyroid daily I mean it is a multi that can also work as a prenatal and that's there's a large study done about how much I don't pregnant women need and they totally need more than non pregnant women but not all that much more.

And we now know that it's also a narrow, sweet spot. Most nutrients are things that are just floating in your bloodstream in the amounts your body requires.

But iodine is present in such microscopic amounts, it requires special handling. You've got ways to pull it in and ways to block it out. And because of that, the window of tolerance is way narrower than for any other nutrient.

So lots of pregnant women need a little more, but we now know that their window is not really that much bigger. They still have to be cautious about getting too much.

Wow, that's incredible. And it's it's it's interesting. I know that nutrition science is evolving constantly, but I don't think that it's translated yet to the fertility and pregnancy world where I feel like it is really relevant to think about.

And I think women are scared to not take iodine because of so much propaganda that has kind of like entrenched this belief that if if we don't take iodine, my, my child is going to have issues.

If you're iodine deficient. That's totally true. But that just there's it's in our diets. The question is what if you're iodine access, that's not a good thing either, right?

The sweet spot as to where you're getting a healthy diet with a good range of foods but not extra on top of that. Yeah, yeah. That's awesome. I know you have some really great tips on when and how to do testing appropriately for thyroid conditions.

Can you share that? Because again, fertility is one of those things that I think is super important to dial in and make sure that people are testing appropriately.

You know, it's really cool. The fertility world has a better job, I think, in many cases than other worlds about looking at optimal thyroid function, that people are getting ranges to where they should be, but having narrower target.

Sometimes it's frustrating that levels aren't as consistent from one test to the next. They can bounce up or down for reasons that don't make sense. And yeah, the timing is a big part of that.

So there's five things I've seen that clearly disrupt your thyroid levels that only goof them up and make them less accurate, that are often not taken into account.

And a big one you asked about was just the timing of menstruation. So there's a window between somewhere around days, ten to date, 22 where the higher amount of thyroid binding globulin can cause unusual thyroid levels.

So you don't want to test the middle portion of your period, like your first ten days, your last week. Those were great, but that middle portion, it won't be as accurate.

So if you're testing, then it might be higher or lower than it really is. That's the first one. Next one to think about is take how they form supplements for about three days.

We've got massive data sets that the supplements aren't harming your body, but they change how your blood works on chemical analysis. They change how your blood interacts with the chemical reagents.

And I can give you a few results. So you want at least a three day holiday there. Next one is fasting. So if you eat a meal that changes your thyroid levels.

So just like you're looking at blood sugar, cholesterol, you want to get this done, fasting. Now with that, there is a circadian pattern to thyroid hormones and we think about normal ranges being tied to our morning thyroid output.

So like 6 to 9 in the morning, that's when you want to measure. If you're measuring later in the day, you get different sets of numbers. The last one is if you're on uncovered medication, you want to test before you've taken your pill for that day.

If you test after your pill, you've partially absorbed it, but it's impossible to predict to what extent you absorbed it. And the baseline measurement of the products of the pill is at the 24 hour load up the pills not gone at 24 hours, but it's at a stable level.

So you want to measure before you've taken that pill. One big reason that thyroid levels are hard to keep stable is because people they might test, you know, first part of their cycle afternoon after meal and the next time they did it differently.

And you get totally different results. So if you do those things consistently results will make a lot more sense from one meeting to the next. Absolutely.

Well, thank you so much for being with us today. And sharing so much of your pearls and your wisdom around thyroid health and some of the crucial pieces around how it relates to fertility and pregnancy.

So, yeah, I very much appreciate you being here. This is an important topic and again, I'm glad to contribute. There's tons of good resource people with good from this now.

So for those of you that are listening and thank you for being with us and we'll be back really soon with more amazing content and trainings with our experts.