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Hi everyone. Today, we're going to talk about infertility. It's a common topic that has come up and if you're following our regular talks, please follow us on our Facebook page, and you can get up to date on all different talks we're doing. Now, infertility is one of these conditions that is really more common than people think.

And just to start with, the definition of infertility is basically, if a couple is having unprotected sex for a year and they're still not able to conceive, that's basically the criteria to confirm that infertility is occurring. Now, what's very interesting, and let me try to give you some latest figures with this, is that 85% of couples that have normal fertility will usually conceive within the first year. About 15% of couples will fall into this category of infertility, where they can't conceive in that first year.

And these are the age groups between 20 to 45, where these different numbers are coming from. And then when you're looking at the statistics of pregnancy, just some really important concepts here. For healthy women in their 20s and 30s, a chance of conceiving each month is about 25 to 30%. But once a woman is 40 years or older, the chances are less than 10%. And the other interesting thing is that when you look at infertility, there's multiple mechanism.

It's absolutely not an endocrine disorder. When you look at female infertility, it really has a lot to do with chronic inflammation, oxidative stress, body mass composition, and lifestyle. And it's really not a nutritional deficiency, it's really not just a need to take certain botanicals. There's some really significant lifestyle factors, and I'll go over those research concepts with you, and then we'll take some questions here as well.

The other key thing to understand about infertility is that there's both male and female factors for infertility. A rough estimate is that when you have a couple who has infertility, one-third of them are related to what's called the female factor, where there's something happening with the female. They have some underlying mechanism infertility, and we'll get into those mechanisms in a second here.

Then one third is really what's called a male factor. And the male factor is really involved with the health of their sperm, and even some anatomical changes where they've got have things like retrograde ejaculation and things related to that, which we'll talk about in a second too.

And then a third of couples suffering from infertility have both male and female factors. They're both involved. That's the key thing to understand, is I think men even underestimate it as a key factor in infertility for a long period of time. And the other key concept that I really wanted to get into before we get started, is the concept of age. Age is absolutely the most important factor for infertility, and it's the biggest contributor to infertility.

Every year that goes by, there's increased risk for developing infertility. And this is more so for women than men, but men also apply to this, but for women especially, once they get past that age 35 window, all of the statistics dramatically change for their ability to have healthy fertility, and it's multiple mechanisms that are involved. Part of it is the quality of their eggs, part of it is their ability to maintain a pregnancy, part of it is their inflammatory load.

There's lots of mechanisms that start to take place just from a consenescence, the physiology of just aging. And that's a key factor that you have to really understand. So, if you're a couple dealing with infertility or you have patients with infertility, here's the first thing. There is a ticking clock. The ticking clock is real. And the most important thing is to really not waste time. What do I mean by that? I'll give you an example.

I had a recent patient friend that is suffering from some infertility. Family members were into alternative medicine, and she let it go too long. She got to the point where FSH levels were high, and she got premature ovarian follicles, and she was playing this alternative medicine game for way too long, and didn't really get a proper thorough workup. And now her chances of having a child are very, very low.

One of the things is, please, especially as you get older and you're getting past that 35 age, point of view, you don't have a year or two to play guesswork with how someone's going to give you a whole different version of botanicals, and one thing after the next to try to make a difference for you. On the other hand, on the other side of the fertility window, you don't want to just rush into doing IVF treatment, which is, in vitro fertilization. They call it assisted reproductive technologies.

You don't want to go on that route, because if you're not healthy, there's a reason why you have infertility. And if you rush into IVF therapy without getting yourself healthy, then you're going to probably have a failed response. Those are the key things. There's a balance of time, where you have to improve your health and physiology, especially if you're dealing with infertility, to figure out what's going on.

And then also there's a point where the clock is ticking, and if you rush into assisted fertility therapies like IVF therapy, or intrauterine insemination, whatever those therapies that are appropriate for you are, and you don't have the health to improve sperm, follicles, whatever the scenario may be, the endometrium lining, then you can have some problems associated with not having success. Those are the things you always have to factor into, if you're a couple, or if your patients are a couple dealing with infertility.

Now, that being said, there's lots of things that have to happen for fertility to take place. We can start with the male first. The male has to have healthy sperm. The sperm has to have mobility, there has to be quality sperm. Basically, semen analysis could rule those out really, really quickly. If they have, for example, low sperm counts, that can lead into other things, maybe they have, like we've talked about earlier, retrograde ejaculation, or they're not really ejaculating their sperm, and it's going up into the bladder, urethra area.

Maybe they have testosterone deficiencies where they can't produce enough sperm. Maybe they have oxidative stress or inflammation that's impacting their sperm count. Maybe they're smoking, for example, dramatically reduces sperm count, or even being around second hand smoke, or being around high amounts of air pollution, can really impact quality of sperm especially if someone has some degree of antioxidant depletion and so forth. In order to have proper fertility, there has to be healthy sperm.

The other key thing that has to happen for female healthy fertility is they have to have healthy menstrual cycles and have regular cycles, and there has to be this coordinated sequence of pituitary release of follicle-stimulating hormone, which will then mature the follicle, and eventually as the pituitary releases FSH, the follicle matures, estrogen levels start to go up.

Estrogen levels will then trigger what's called the luteinizing hormone, LH surge, and then the LH surge will then lead to ovulation, and then development of a corpus luteum, and then the corpus luteum is going to put out estrogen and progesterone to the second half of the cycle, and then those things have to take place. There has to be normal menstrual cycle function.

The endometrium needs to be healthy. Endometrial tissues need to be healthy. There can't be fibroids in there. There can't be any types of inflammatory response in the endometrium. Those are going to impact things like implantation. A lot of research is now showing that the peritoneal fluid, the fluid in the pelvic cavity in the abdomen, can have a huge impact in fertility. And really inflamed peritoneal fluids can really impact many factors related to infertility and implantation, and be able to maintain a pregnancy as well.

Those are all key factors in a normal response to pregnancy, and then the female has to be able to maintain that pregnancy all the way through. Lots of things can go wrong in that pathway, and lots of mechanisms can be involved. Now, what's the first step? Well, I think the first step is really understanding where you stand with time, how much time you have to get healthy. As you get older, you really have to really focus on this.

And for some patients, they're just too casual. They're like in their mid 30s and go, "I'll focus on my health a little bit. I'm working on it. We hope to have a kid next year." And it's, well, if you're in the mid 30 age group, your health, especially related to factors that impact infertility, which we'll talk about a second, should be the most important thing if you're going in that route, because the chances of having infertility go up by every single year.

Now, the other first thing that really has to be done, and this is where you don't want to miss time is, you want to make sure that the obvious things have been done. The obvious things are, making sure that you don't have any abnormal pelvic anatomy. It's really critical for females and males to get checked out. If they're a couple, trying to make sure that they're not having infertility issues, especially if they have infertility, meaning that they haven't been able to get pregnant after one year.

The key thing is, first of all, is there any pelvic anatomy issues? Are there any scarring, are there any adhesions that may be involved? And basically when you look at anatomy, there are three main, what they call factors, with infertility. One of them is called a tubal factor. Tubal factor means, is there anything getting in the way in the fallopian tube from the egg to descend down into the endometrium? For example, endometriosis leads to lots of scarring there.

The second factor is the cervical factor. The cervix has to be healthy, has to produce lots of mucus, has to have space. There can't be things like cervix stenosis. Cervical stenosis, that's where there can't be any anatomical changes impacting the cervix, that's another changing anatomy that can get in the way. And it's unrelated to just trying to do some subtle lifestyle interventions. Now, let's [inaudible 00:11:16] that surgical factors like mucus production, so forth, but if you have cervical stenosis anatomically, that can really impact your potential to have a healthy pregnancy and become pregnant.

And then there's a uterine factor, which means that the endometrial tissue, the uterus has to be healthy. That there's no masses or tumors in growth. At the very, very minimum, before you drip into lifestyle treatment protocols, where you're trying to jump into strategies to impact fertility, you really want to make sure that the very basics are done typically by OB-GYN.

You want to make sure that they have a gynecological ultrasound to see if the anatomy is okay, if they see something suspicious, they can use cameras and do what's called hysteroscopy, and then look in the uterus to see if there's any growths, or tumors, or any masses. If they suspect that you have something like ectopic endometriosis, they can do a laparoscopic evaluation, where they stick a camera in the abdomen, which is a little bit more invasive, or they can do MRI studies. They could even do fluid and dye studies, hysteroscopy and urogram can be used to look at dyes and see if the fallopian tubes are intact.

You really want to make sure there's no scarring in the pelvis, especially if there's ever a history of endometriosis. And endometriosis, the typical clinical presentation of that, is pelvic pain as it relates to the menstrual cycle, is one of the key factors. One of the major causes of infertility is basically endometriosis, and endometriosis can lead to scarring. But also endometrial tissue has been found to be very inflammatory, and it changes the environment of the uterus and of the ovaries to healthy development of the follicle, to fertilization and to implantation.

Endometriosis is something that we'll talk on a second, but it's also a key factor. You want to make sure there's anatomical valuations to really address just those patterns. And then, the most obvious things that always have to be done, besides making sure that the female anatomy is okay, and semen analysis has been done to make sure there's no changes in sperm patterns, is to then evaluate for things like hypothyroidism. Hypothyroidism can definitely lead to infertility, so just running a simple thyroid panel can be important to do.

And then always, because 7% of infertility cases are due to hyperprolactinemia, so always prolactin levels should be measured. Serum prolactin, serum TSH, pelvic examination, semen analysis is like the minimum. If that hasn't been done, you can really be wasting time. Let me give you an example. A person has infertility, they walk right into alternative health care. They walk right into working with an Ayurvedic medicine, or a Chinese medicine person, or a functional medicine person or whatever, and they just jump into an immediate nutritional protocol, maybe they have their cocktail of herbs that they're going to use for fertility or whatever the case may be.

And then there's actually like scarring or endometrial tissue that's promoting these patterns. That's really going to really waste time. And maybe they're going after all these treatments for the female, because typically the female person in the couple is proactive, and it's really the male issue, it's the male factor. The male semen has never been analyzed. They don't really know if that's the reason for it.

You really want to understand that at the very, very basic, in order to not waste time, because there's a ticking clock. Female mechanisms have to be ruled out, semen analysis has to be done, TSH has to be done, and prolactin levels have to be measured. And that's the minimum. If you're a person suffering from infertility and that hasn't been done, then you're not in the right place. Whoever you're seeing is doing less than the minimum of standards of care.

And also, if you're working with people that are so-called fertility specialists, especially in alternate medicine, they really should make sure that you've had those things done before you move on.

Now let's say there is no pelvic anatomy issues that are there. Let's say there may or may not be a male factor involved, what are the most common causes of infertility? And what has the literature really shown? The number one reason, as we repeat here, the number one reason that infertility takes place, is senescence. Senescence being defined as the physiological changes that take place as we get older, as we age. As we age, different things take place in both males and females, that increase the risk for infertility.

First of all, when you look at females, females only have so many eggs that they're born with, but over a period of time, they tend to lose them. And when you look at people that are going to IVF therapy, for example, female in their 20s will have 80% of their eggs healthy that will respond to IVF, women in their age 40, will have maybe 10% of their eggs that are healthy enough to respond to IVF. Aging alone has a dramatic change on these follicles and these ovarian eggs. That's one of the key factors.

Besides that, as we get older, we lose our immune resilience, in the sense of, our inflammatory resilience, so it's much easier for us to get inflamed. We're also more prone to oxidative stress because our physiology is not as efficient as time goes on, and those factors are a major also cause, of why aging maybe a variable, and also menstrual cycles become less efficient over time with females. Their receptor sites tend

to be less responsive to things like FSH, feedback loops get less efficient. Those are all key factors. Age alone, without any other variable, is one of the major risk factors.

The second one, the most common, one of menstrual imbalances and loss of ovulation or impaired ovulation and change in menstrual cycle from one cycle to the next, is a condition called polycystic ovarian syndrome, and the hallmark of that condition is insulin resistance. Insulin resistance, typically is defined as having your glucose levels higher than normal, the lab range, being prediabetic, being overweight can be a big factor in promoting this PCOS pattern.

Let's talk about females first. In females, insulin resistance actually increases activation of ovarian cells called theca cells, and that causes them to produce higher androgens. And these higher androgens then start to disrupt pituitary feedback loops between FSH and LH to the point where they can have ovulatory disorders, where they have different cycle lengths, they can completely lose their menstrual cycles, when their androgens levels get too high androgens activate the follicles in the uterus, so they get what's called polycystic patterns.

They get lots of different cysts in their ovaries, and then they get stuck in this vicious cycle. And if a female has PCOS, even if they do IVF therapy, their chances of success is pretty low. One of the key factors is PCOS. Anyone that has fatigue after meals, craves a lot of sugar, their insulin levels are a little bit high, that would be one of the first major things to consider as you look at the path of getting healthier and making sure that you have ideal fertility.

Now for men, insulin resistance, that does its own thing. Insulin resistance in many men are prediabetic, have fasting, blood sugar levels are high, crave sugar all the time. Insulin resistance causes these insulin surges to take place in their body, and insulin surges activate an enzyme in body fat in men called the aromatase, and they start comparing their testosterone to estrogen, and they lose their energy and dominance.

This can have impacts on sperm health, this can throw off feedback loops between the pituitary and their testes, and they can have less quality sperm. And if their testosterone almost is going to be impacted by this, they can also have lower quantity sperm. We know that insulin is a major factor. And then when you look at the research you can see like polycystic ovarian syndrome itself, which is a prediabetic stage, but it's just typically evolve with being overweight and even obesity as it progresses, are a major factor in infertility.

But they've also done research on BMI, Body Mass Index of obese individuals, even unrelated to insulin resistance, and they find some very interesting things. One of the things they find is that fat tissue, especially if there's excess fat tissue, contained in what are called, adipocytes, and these adipocyte cells release something called adipokines, and adipokines can really disrupt pituitary feedback loop function, in both males and females.

Just having more body fat releases these adipokines that can disrupt feedback loops between the pituitary ovarian system or the pituitary testicular pathways. That's pretty interesting literature. They've also found, even more interesting, that individuals that are underweight, they don't have enough body fat. Let's say the totally shredded, totally cut athlete. They have a higher risk of infertility in development, and many of them eventually end up losing their cycles.

And part of the reason this takes place, is because body fat isn't just a tissue that store calories, body fat is part of the endocrine system. And adipokines not only can lead to disruption of pituitary feedback loop with obesity, but adipokines are a normal part of endocrine signaling in immune function. When you see a female person that starts to get really, really thin and has really, really no body fat, they can become infertile because of that. And you can also see a lot of underweight individuals, constantly missing meals, they could be hypoglycemic, that can disrupt their endocrine function as well.

You'll see generally people who have infertility, the overweight person has the PCOS, polycystic pattern, prediabetes pattern risk factor, but the one that gets overlooked is actually, I see more common in my practice or my career, is the underweight patient that has lost their menstrual cycle or has infertility issues. And part of it is, they're just not eating enough caloric intake. And if they don't eat enough calories, or if they over train, or a combination of both, their physiology turns into a starvation pattern, and that totally shuts off what are called gonadotropins, that are necessary for healthy ovulation.

Being underweight, not having enough body fat, can really be a factor in infertility. You need to have some body fat to produce adipokines, which are cell messengers of body fat, and those adipokines are a normal part of pituitary feedback loops. Beware of that. That's very common as well.

The interesting thing is working with patients that are underweight. There are [inaudible 00:22:55]. Some of them truly have psychological eating disorders. They don't understand that they do, but they do. They truly will say stuff like, "Well, I had a couple of fruit yogurt in the morning and I just wasn't hungry till 4:00, and I didn't eat anything else. And then I forgot to eat dinner also that day."

And you're like, "Well, your body has to have some degree of body fat and calories to maintain your metabolic needs." You'll find they have different excuses or like, "I just don't like eating fatty food." Or, "I just don't like eating healthy fish. I just don't like ..." They're fatphobic, they reduce calories. It's actually one of the most difficult patterns in infertility to work with clinically, because the patient themselves doesn't see that their diet and lifestyle that served them well with impacting their figure and how they look, is really getting in the way of their infertility.

Now, endometriosis, we talked about earlier. Endometriosis is a major, major cause of infertility, and it's not just because of scarring. Endometrial tissue creates an inflammatory cascade, and the inflammatory cascade that's triggered by endometrial

tissue in the pelvic structures can impact follicles and follicle development, and can impact fertilization and can impact implantation.

Endometrial tissue, it's very interesting about endometrial tissue is that, the underlying mechanism is something that really centers around something called cyclooxygenase-2 activation, which makes prostaglandins, and prostaglandins are very inflammatory. And these inflammatory mediators can completely disrupt all aspects of physiology. Sometimes you have to really manage their endometriosis from a diet lifestyle perspective, to really have a chance to treat infertility, even though there's no scarring in the way.

The next major area of research that's involved with infertility, is related to that. It's just inflammation and oxidative stress. Inflammation pops up with all chronic diseases as an underlying mechanism, and it's definitely a mechanism with male and female patients. Chronic inflammation, oxidative stress is immediately going to do some sickening significant things in both male and female anatomy.

With females, it's going to rapidly decline their healthy eggs. The more inflammation a female has, the more oxidative stress they have. Their egg reserves are going to go down very, very quickly. This is why some females develop premature ovarian failure. They just have so much inflammation, it's oxidative stress that these things happen. And these are conditions that are very inflammatory, like an underlying autoimmune disease, like celiac disease, like Hashimoto's, like rheumatoid arthritis, inflammatory bowel diseases, Crohn's, ulcerative colitis, undiagnosed IBS.

All those inflammatory mechanisms are going to create inflammatory cascades that will speed up ovarian eggs, so they're more risk for premature ovarian failure. And in men, oxidative stress inflammation basically impacts their sperm. Now there's a difference between males and females. Males can change your oxidative stress and change your diet and lifestyle, and really improve the quality of sperm in a very short period of time.

With women, there's no changes in diet, and nutrition, and lifestyle. They can make their eggs healthier, that we know about, that's been published yet. All we know is that the inflammation and oxidative stress just reduce numbers of healthy eggs, much more quickly. And there's no way that we can rejuvenate them.

With males, things like antioxidant therapy, testosterone, can rejuvenate sperm and make them highly functional, because sperm is still being synthesized on a regular basis, with ovarian egg, is they've already been developed before even the patient was born, so you can't remake them. They're just there. All they can do is lose them at that point.

The other key things is just psychological stress, also. Lots of literature showing psychological stress is a huge impact in fertility. When I do these prospective studies and look at couples and look at infertility, one of the key things they find is that, statistically significant patterns are shown with couples that have a lot of stress and

infertility. It's like the most overlooked part of it, but psychological stress is a key factor in having a healthy fertility.

You got to really look at someone's lifestyle, and their workplace, and their relationships to see if that's a factor and the significant shouldn't be overlooked. And then, overtraining syndromes. Overtraining, working out, those are all factors. That's where you see the abundance of the literature. Those are the main mechanisms that are there. And if you can see that, these aren't necessarily related to a single nutrient deficiency, they're not related to an herbal deficiency, most of this is just lifestyle and really just making sure that the patient overall is healthy.

Whether a male has infertility patterns, the male factor, or whether a female has infertility, the female factor, basically what you're finding is you're finding early patterns of chronic inflammation, blood sugar disorders, immune dysregulation, or some endocrine disorder like prolactin levels or hypothyroid.

Now, those are the well-established published mechanisms on infertility. Then there's some less established, but very real and insignificant as well, which are things like endocrine disruptors, lots of endocrine disruptors in the population, chemicals, for example, plastics, BPA can combine to hormone receptors and cause some imbalances. There's recent research showing the health of the microbiome ... Hi.

Hi.

... the health of the microbiome can impact fertility. More and more research is going to ensure that, I think that's going to be a key factor, and how important good health is. Things like having proper essential fatty acids in the diet, which are ... Essential fatty acids are fats that are essential. Your body can't make them. They come from things like flaxseed oil, or fish oils. These are two important essential fatty acids, and things can disrupt these essential fatty acid makes, like eating lots of fried foods, lots of saturated fat, not having healthy fats.

These things change what we call prostaglandins, they impact fertility. There's even subtle endocrine disorders where someone may have like some thyroid issues, maybe they're metabolizing the thyroid efficiently, or maybe they have some changes in their protein globulins that really, I think, more functional medicine practitioners shine.

In a typical recap, I would say, in a clinical setting, if patients have infertility, it's a combination of all these factors, it's not one thing. And those are the things, I just wanted to make sure I share with people because it's not simple, it's a little bit complicated.

But also, if a person has some degree of infertility rates, male or female, it's a red flag that they're unhealthy. And that there's some issues that are underlying, that really need to be addressed. And those may even be more important than just the fertility part of it. Because they're going to end up with risk factors for chronic diseases and other, other mechanisms as well. I talked a lot. Sorry.

[inaudible 00:30:20].

It's a lot of topics, and I don't think I've done it justice, but I just needed to cut it off at some point. Let me take questions.

Okay. Hi.

Oh, by the way, we do have Kharrazian Institute Course coming up, that I'm teaching for healthcare professionals in infertility, and I'm going through all the research, and all the clinical models, and mechanisms, and how to read lab tests, and how to work through the clinical model of infertility with healthcare professionals. It's very technical. If you're not a healthcare professional, may not be the best thing for you, but if you're a healthcare professional, it might be something you may want to check out. If you go to the kharrazianinstitute.com, you'll see a course for infertility that's there.

Quickly. Alice is saying, "Today happens to be International Pregnancy and Baby Loss Awareness Day."

Really?

Yeah.

Okay.

Very ethical today.

Thank you for letting us know.

[inaudible 00:31:13], I didn't know that.

We didn't know that. I didn't wear a pink shirt. This is kind of pink, because of my topic. I just figured-

[inaudible 00:31:22]?

... I dunno. To me pink was fertility, so ...

Well, good job.

Thank you.

All right. Shawn asks, "What causes uterine fibroids, and how does it impact fertility?"

Yes, [crosstalk 00:31:42].

Just start with the easy one.

Good question. Uterine fibroids are a complete mystery as far as ... There isn't one single factor that we know. [inaudible 00:31:57] genetics maybe one of the biggest

factors. And they're very hard to treat from a natural medicine model. There isn't any like breakthrough herb, or taking things like progesterone is going to make any real impact on them. They're really hyper vascularized anatomy, and these fibroids can really get in the way of healthy endometrium and they can impact the healthy implantation.

The issue thing about fibroids isn't that they just are enlarged, but fibroid tissue actually creates inflammatory mediators. One of the things that's really important to understand about all the research on infertility is that they're really looking at what's called the peritoneal fluid factor, which is the fluid that's in the abdomen and in the pelvic structures, like in the uterus and in the fallopian tube. And this fluid, if it has a lot of inflammatory mediators and immune mediators, it dramatically increases the risk for infertility.

Even though a fibroid may seem benign and be small, it can be releasing a lot of these inflammatory mediators. And there isn't really any significant lifestyle factors that have been clearly identified that promote them, that people can change to change their fibroids. And there really isn't a hormone cocktail that can shrink them, and there really isn't any nutraceuticals or botanicals that has really been shown to make a big impact on them at all. That's one of the key factors of fibroids.

I think if that's the issue then looking at some of the treatments, the least invasive one is where they do embolization, where they just basically take chemicals that they can use to impact the vascularization and blood flow, that do align into their arms, [inaudible 00:33:57] like. They'll go with a camera, get into the uterus and then find the arteries that are there that are going to these fibroids, and basically release chemicals to cause them to basically die off, so the tissue can atrophy and that it can release their fiber activity.

Fibroids, they're tough. And if that's an issue, then take care of that because especially if there's the cooking talk that's happening.

Stephanie is asking, "If a woman in her 30s has Hashimoto's, but has stable thyroid panels, can that still affect ovulation?"

Yes. What's interesting with the thyroid research is that there's two factors for infertility with Hashimoto's and hypothyroidism. One factor is, if a female is hypothyroid, meaning they're thyroid hormone deficient, and that's defined by a TSH being high. Thyroid hormones play a major role on reproductive tissue, and pituitary feedback loops, and receptors for pituitary hormones, and reproductive hormones. If there's hypothyroidism and actual thyroid hormone deficiency, it's going to be a major problem.

But what they've also done is they've looked at just antibodies, and what they found is ... In your case, your Hashimoto's is a stable, meaning you're not having to increase your thyroid dosage, your hormone levels are adapted for a managed, but just that the antibodies themselves, they found that those that have elevated TPO antibodies,

thyroglobulin antibodies have significant risk for developing infertility, unrelated to the thyroid hormones, and they'll also have less success with IVF therapy.

And that goes back to probably the underlying inflammatory mechanisms that are there in their system impacts fertility. It doesn't mean you can't have it. It just means it is a risk factor. Part of it may be, why it's so important to not just look at that thyroid hormone side of it, but also how do you improve auto-immunity? An autoimmune diet and lifestyle would be the best strategy, and if you can calm down the autoimmune expression in the body then ... We have a little puppy. She's looking really ...

I'm sorry. [inaudible 00:36:21], sorry.

But anyways, you really want to just control the autoimmunity as well, but it is what it is.

Sorry. It must have been here.

Go ahead.

Stephanie is asking, "When you're talking about inflammation, you're referring to systemic inflammation, and we'll see lab changes, correct?"

No. This is a very interesting thing.

Yes.

You may not see it. You might not see the inflammation caused by fibroids in any blood work. You're not going to see CRP levels go up. You're not going to see ESR levels go up. You're not going to see ferritin levels go up. Some of these local tissue, you can only find it in the peritoneal fluid, or you can only find it with tissue biopsy, but there's an underlying inflammatory cascade that takes place with infertility.

However, if someone has very noticeable inflammation in the body like high CRP, or they have active autoimmunity expression or some things, that for sure is going to activate and change the peritoneal fluid, which is going to have an impact on infertility, and even impact endometrial cells, and promote more endometriosis and other types of factors.

Let me give you a common mechanism by the way. Ectopic endometriosis, where women can have this endometrial tissue in their abdomen and other tissues, one of the things they find with it is that some of these women have what's called a retrograde menstruation. The uterus sheds, but they can't really get all the fluid tissue out through their cervix, because maybe you have cervical stenosis or other factors, so the blood gets out through the fallopian tubes gets into the abdomen.

And if the peritoneal fluid is inflamed, then they can have ectopic endometriosis develop. And then that endometrial tissue will create its own inflammatory cascade that you can't measure in systemic levels, but it's an endometrial tissue. Diseases like celiac disease, for example, or autoimmune, or your chronic inflammatory conditions increase

the risk for endometriosis. And then once endometrial tissue develops, you can have inflammation at the local tissue site. You may not always be able to pick these up on lab work. And that's what makes it difficult.

Kristen is asking, "Will you talk about reoccurring miscarriages at seven-day, eight-week mark after the presence of a healthy heartbeat?"

Reoccurring messages means there's-

Miscarriages.

Reoccurring miscarriages-

Seven-day, eight-week mark.

Reoccurring miscarriages, most common causes that there's a defect in the embryo. Those are usually related to unhealthy ovarian eggs and unhealthy sperm. The other possibility is that the uterine lining is not healthy enough to maintain a pregnancy. It really goes back to all of the various physiological factors that impact inflammation, bad flow or circulation, make sure you're not thyroid hormone deficient, oxidative stress, and those responses as well. The big picture still for reoccurring miscarriages, not just one factor.

Stephanie, "Any advice for an ovulatory cycles that are irregular with high androgen levels affecting things?"

If you have irregular menstrual cycles, and some ovulation imbalances, and high androgens, you basically are in the category of what's called polycystic ovarian syndrome. And that is a secondary to high insulin and insulin surges. Insulin surges are going to take place if you're eating a lot of sugar, a lot of carbohydrates, or maybe not eating a lot of those things, you're eating what a lot of people eat, but you're just not getting any physical activity.

But the combination of like lack of physical activity and then carbohydrates, and lots of sugar, lots of frequent meals, late night snacking, all those things increase insulin levels. And if insulin levels are high, they actually stimulate the ovarian theca cells to produce androgens. And then that'll throw off your feedback loop with the pituitary. The way you really change that is you really control your insulin. That'd be ideal scenario. And studies clearly show just losing a little bit of weight.

It doesn't have to be like ... You don't have to turn it into an athlete with the six pack. But you're just losing some weight and getting insulin down can completely reverse that. And that would be the place to focus. Don't waste any time with botanicals to stimulate fertility and pituitary and all that stuff. It is a blood sugar insulin pattern that needs to be addressed.

Sean is asking, "I understand elevated SHBG in males-

Elevated sex hormone-binding level?

I think so.

Okay.

... in males binds to and decreases free testosterone leading to lower sperm count. What causes high elevated SHBG in the first place?"

The [inaudible 00:41:34] in males?

He's asking males.

In males, the most common cause of elevated sex hormone-binding globulin is actually insulin as well. What happens is insulin levels in males, they don't cause androgen elevations. But what happens with insulin levels in males is, insulin just turns on this enzyme in body fat called aromatase to express really aggressively. And that'll convert men's testosterone to estrogen. And as soon as men's estrogen levels go up, they start to make more sex hormone-binding globulin.

The most common cause of sex hormone-binding globulin production in males is having too much estrogens. There's some possible for environmental estrogenic compounds to be a factor there. That's still not clearly established, but it could be combination of environmental endocrine disruptors, but most typically it's just because of elevated insulin, [inaudible 00:42:24] leading to aromatization of converting testosterone to estrogens. Then that decreases the free testosterone levels.

Stephanie is asking, "Can taking birth control pills for 15 years affect overall fertility?"

Yes. It's called post birth control pill syndrome. And what happens is, if someone's been on birth control for a long period of time, they just lose the integrity of their pituitary feedback loop and everything we talked about has to become efficient to get that system to work again. And sometimes to be quite honest, it doesn't work. I've worked with some patients that we've tried every possible thing, and we were not able to reverse it.

Now I will tell you it doesn't happen with a lot of women, but there's a small population of women, if they'd been on birth control pills, they really have an issue and they can reestablish their pituitary feedback loop. What those variables are, I don't know. I've looked extensively to try to find them myself. I haven't been able to find what those factors are, but it does happen.

Kristin, "What if you have PCOS and are not diabetic or overweight?"

This happens a lot. Thank you for bringing that question. There are a lot of women that have high androgens, but they don't fall into PCOS, or metabolic syndrome insulin, or prediabetic patterns, or actually maybe even normal weight, or even underweight. It's

common and basically it's still a dietary, but [inaudible 00:44:03] issue. It's just that it's what they call atypical metabolic syndrome or atypical polycystic ovarian patterns. Just know that it's really common occur with hypoglycemic people who miss meals all the time.

And the first thing I would think of if someone has high androgens and they're not overweight and don't have the typical overweight polycystic pattern, but have high androgens is their hypoglycemia is a key factor. Every time your blood sugar levels drop your body has to release hormones like glucagon and cortisol to get your blood sugar levels back up. But it also causes an insulin surge. And those insulin surges still stimulate the same theca cells.

Drops in blood sugar, hypoglycemia, missing meals all the time can actually promote these androgen increases as well. I've had personal experience working with lots of different women over the years that they have high androgens, and they're hypoglycemic, and their blood sugar levels drop all the time, and we have to get their blood sugar level stable to be able to stop the androgen load. It does occur in underweight people that don't fit the classical PCOS pattern.

Julie's asking, "What if there is a connection between fertility issues and offspring who are diagnosed with ADHD?"

Well, when you're looking at fertility issues this is the point too. When I work with patients, I go, "It's not just about getting pregnant, but having a healthy pregnancy and having a healthy child." Sometimes infertility just rushing to get therapy can have an impact on the various risk factors. If you have someone who has chronic inflammation and chronic stress responses, there's clear studies that show that it has an impact in offspring, can impact developmental issues, how the brain develops, how even risk for autism goes up for high androgens.

High testosterone has a significant higher androgen levels especially during their pregnancy, increases the risk for autism, getting an infection during pregnancy, having lots of inflammation, getting immune activation increases risk for things like autism, and other childhood developmental disorders like ADHD.

This goes back to, if the person has infertility, take a step back and just think about what part of health is not there. Now, for some people it's not related to any of those things. And we just don't know what it is. Also please don't beat yourself up because thinking, "Oh, I could've done more, and it's because of me." Because that's not how it works. It's not that simple. There's just some children that even after ... Remember the brain is constantly developing. The brain isn't just developed from birth.

The brain has gray matter and white matter. Gray matter is fully developed until age nine, and then white matter is developing till age 20, 21. It may not have anything to do with the infertility or the health of the mother during pregnancy as well. It's just that once they're born, they're just not getting various variables that are involved, that isn't allowing their brain to develop as fast as other kids.

If it doesn't happen, if it doesn't work well in the frontal lobe, then that's where we have ADHD patterns and so forth. I think we did a talk on ADHD.

We did.

We did.

Just [crosstalk 00:47:30].

We have a video on ADHD. We talked about those mechanisms more, but we may want also to check that out. That's my best answer, but there's impacts of various health variables that can impact offspring that you want to be aware of. The main ones are inflammation and psychological stress.

Karen is asking, "Any recommendations for supplements for infertility relating to autoimmune, or oxidative stress, or overall health? Any generalized infertility-"

Infertility supplements?

Yeah.

Infertility magic.

Stop it.

I'm just joking. Let me answer this seriously. I'm being facetious and joking, and maybe it's not funny, but-

Backcountry.

Backcountry. Listen, the most important supplements for fertility are probably ... First of all, you got to make sure you have no significant nutrient deficiency. Taking the [inaudible 00:48:27] multivitamin minerals is really important. The most popular mineral they've studied over the years has been fully folic acid. That's been important. One of the most underlooked is essential fatty acids, or things like flax seed oil, evening primrose oil, borage oil, fish oil.

Fish oils have really been suppressed because there's such a concern for having heavy metals in those compounds. There are some suppliers that do measure their levels, that have healthy levels of Very low levels of mercury or other toxic compounds in them. Not all fish oils are the same. Some actually do have that evaluated, but getting healthy oils and having some basic general nutrition is really important.

Having lots of anti-inflammatory antioxidants is also a really good idea, whether it's just the basics, like vitamin C, alpha-lipoic acid, or even just very, very powerful super foods like acai extract, or blueberry extract, or pomegranate extract, grape seed extract. You can find all those at the health food store. If I was looking at let's say, a family member, a loved one, or a patient that was just trying to improve the general nutritional status for healthy pregnancy, I'd want them to make sure they had very good multivitamin mineral.

I want to make sure they have healthy amounts of essential fatty acids. I want to make sure they have lots of powerful antioxidants in their system as just a baseline general concept. Now, obviously if you can work up a patient and apply more of a personalized model, things can change a lot. But those are basic foundations.

Hatis is asking, "How do you determine if the endocrine problem is about too low estrogen or too low progesterone? How do you ... Is there a test you can do?"

Most fertility patterns are actually not related to the estrogen or progesterone. That's the thing. It's typically not a hormone deficiency. It's typically an immunological or blood sugar endocrine insulin patterns that are then throwing off feedback loops. When you're looking at, let's say, a female. Let's start with females first. We look at a female patient. They're like 20s, 30s, [inaudible 00:50:48] 40. They don't have endocrine depletion, they don't have endocrine failure.

There's something throwing off their endocrine system. It's not necessarily endocrine game. Estrogen, progesterones aren't really the factor. The ovulation is a key factor, making sure that they ovulate properly and having a proper FSH/LH response. I remember the menstrual cycle. The key thing about the system is to tap ovulation to take place. The hormones themselves are a factor, but it's really their surges that are important for it.

I wouldn't say looking at hormones would be the biggest clue to be honest with you for females. Now with males, males need to have testosterone to produce sperm quantity and sperm quality. And lots of males ... Males can have what's called primary andropause or secondary andropause, and it means whether their testicular cells are not working well. The most common cause for testicular cells to not work well in men, there are cells called Leydig cells that produce testosterone, is there's lots of inflammation in the body.

Lots of oxidative stress and environmental compounds are a big factor, the free radicals and cigarette smoke, air pollution, endocrine disruptors chronic diseases that cause inflammation can all impact the testicular Leydig cells and cause hypogonadism. This is the other thing, lots of men have looked at testosterone. Just jumping into testosterone therapy is overlooking the fact that something is causing that.

Those are the things to remember that really these hormone imbalances that take place, whether it's depending ovulation or sperm are secondary to environmental immunological, or patterns, or things like dysglycemia, like insulin surges, and so forth.

Sorry. Veronica is asking, "Premature ovarian failure-

Yes.

... where does that fit into your overall physical health?"

Premature ovarian failure is a combination of genetic susceptibility plus environment. And basically you do diagnose it when FSH levels go up. Basically a female patient has

a laboratory pattern like their menopause. Follicle-stimulating hormone is a tool that's measured, and follicle-stimulating hormones released by the pituitary gland stimulates the ovaries to activate follicles, to mature and produce estrogens, and so forth.

But at some point, premature ovarian failure, the ovary stop responding to FSH. FSH levels keep going up, and up, and up, and up, which is the classical pattern of menopause. It does happen with females, and basically they are having lots of inflammation. Oxidative stress, that's the one mechanism we know about. And sometimes it's just the genetics are much more important. That's why also within fertility, you just want to know when your parents have gone into menopause, their grandmother, or your mother, and see an idea of what your genetic window is.

But also inflammation speeds all of that up. And then also I should say that there are some of them when they get ovarian antibodies, they get premature ovarian failure, secondary to ovarian autoimmunity. Anytime somebody has an autoimmune disease whether it's Hashimoto's, or I don't know-

RA.

... RA, or something like that, that's one of the things that should be checked, is antibodies to ovarian tissue. Ovarian tissue antibodies are a factor for premature ovarian failure. Also men and women can have antibodies to sperm. Male could have sperm antibodies so they become infertile. A female could have antisperm antibodies, and they'll [inaudible 00:54:34] for the massive destruction of any sperms. They can't get pregnant. Those are typically [inaudible 00:54:40] patients that have other autoimmunities as well. So, beware of those.

Sean is asking, "Other than lowering body fat, how can low carb or keto diet impact fertility?"

Low carbon and keto diets can have a huge impact on fertility in a very positive way, because insulin levels go down and inflammation goes down. For a lot of ... Let's say, if a person is suffering from infertility and their BMI is a little bit up, and they get really fatigued and tired after they eat, and they got some insulin resistance, they have high androgens, going on a ketogenic diet can be very helpful for them, because it'll shift them.

When a person goes on a ketogenic diet, the ketones have no negative impact on feedback loops. There's no concern with that. There's no adverse effects that'll take place. And if someone's doing ketogenic diet properly and still getting lots of vegetables in their diet, they're going to get all their micronutrients that they need. They're going to support the gut microbiome. It's going to work really well.

And even those that have normal body weight, but have high androgens, that are hypoglycemic where they miss meals all the time, if they get into ketosis and start using ketones for fuel, they don't get those blood sugar spikes, those insulin surges in between the spikes. And that can also help both overweight and underweight patients

that are suffering from infertility and high androgens. We did a talk on ketosis too, in our library.

We did. On this page. You find it on this page.

Yes, on this page. And again, please follow us on our Facebook page if you haven't, and then we can notify you of all the talks. Look them up on your feed.

And you have access to them, past ones. Julie is asking, "How important is it to do a detox for both men and women prior to trying to get pregnant? I was advised a high percentage of female toxins are passed to their first ones."

Sure. It depends who you ask. If you ask your conventional reproductive specialist, OB-GYN, they can say, "No literature, blah, blah, blah." And there's some truth in that. If you ask people that actually practiced in the trenches, do functional medicine, do provide a medicine, they can be a little more critical and that's going to be more important to them. There's going to be biases in who you see in how their philosophies are.

I personally think it's always a good idea to really support biotransformation, supporting your clearance of hormones, and any compounds. As a matter of fact in clinical practice, we'll actually measure things like urinary glyphosates and measure pesticide levels with patients. And if they're very high, we want to really support their biotransformation pathways, and see if we can lower those levels.

Because pesticides, and glyphosates, and compounds will impact the embryo, will impact the fetus, and we want to make sure that those toxic loads are reduced. I think it's a good idea to measure them. Lots of laboratories can allow measurement of urinary pesticides and urinary glyphosates. And that's one part of getting a patient healthy and removing potential risk factors from an environment.

Emily is asking, "Is there a research ..." [inaudible 00:57:47]. Is there research on adipokines available on PubMed? And do you have any point of view on lean type PCOS?

There's no shortage of literature on adipokines on PubMed. If you're going to type in that word, you better set some time to read it. There's plenty of research on it. What's the second part.

Do you have any point of view on lean type POS? I don't know what [crosstalk 00:58:08].

Well, lean type PCOS, we talked about earlier. It's just they're getting constant blood sugar drops that still cause insulin spikes. You still have to stabilize blood sugar levels, meaning you got to stop the hypoglycemia. Biggest clue that you're hyperglycemic is when you eat, you feel better and you feel energized. The normal response to eating is just, there's no change in energy. Basically eating frequently enough but not getting carb overload, so you have energy that's stable throughout the day without crashing,

and not missing meals, and not eating like a smoothie for a meal will be ways to manage that.

Smoothie for a meal. [inaudible 00:58:45] 20. Dixie is asking, "You mentioned high FSH. What are other causes of early menopause?"

Other causes? Do you mean early cause of premature ovarian failure?

She said-

High FSH.

[inaudible 00:59:03]-

Listen, age is the most common, and then follicle depletion is the key factor. Follicle depletion is due to oxidative stress, inflammation autoimmunity. Those are the main ones, and genes. Outside of that, I don't know of any other ones.

Sorry. Brian is asking, I don't know if you'll understand this. "Why short luteal phase/short cycle?"

Short luteal phase. Short luteal phase is really, really common. It's the most common feedback loop and balance. It's really because you're not producing enough luteinizing hormone. The corpus luteum isn't getting its activity, the most common cause of that is high androgens. Most common cause of high androgens is a blood sugar problem. It goes back, but that's the main mechanisms.

And then people are asking if you can do a talk on just female and male hormone.

Yeah. I think we have a list of, I don't know, a few topics right now for everyone's feedback that-

[inaudible 01:00:03].

... Susan has been so kind to put to a list. The topics we pick are really based on the feedback we get. But thank you for all of us that joined us today. And hopefully you found some information useful to you related to fertility, and we'll see you guys next week. And don't forget to-

[inaudible 01:00:24].

... [inaudible 01:00:24].

Yeah.

Yeah. Okay.

Okay.