Learn About PCOS: An Evolutionary Response To Lifestyle & Environment Transcript

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Introduction and Guest Background

Welcome to the PCOS SOS Summit. I'm your host, Dr. Felice Gersh, and I'm very excited today to welcome my guest, Dr. Jim Parker, a multi diplomate doctor, scientist and researcher.

Jim hails from the land down under from Australia, where we met several years ago when I was there lecturing and we became fast friends ever since. We even authored together several articles that got published in some very prestigious peer review journals, and he agreed to join us for this summit to talk about a very interesting topic, which we will get to in a moment.

But first, welcome, Jim. Can I call you Jim because you're my buddy. Dr. Parker. You can yes. Great. Welcome. Thanks for having me. And I would love to have you tell all of our viewers a little bit about yourself and how you became interested in PCOS and all the other research that you're doing.

I just have to mention that Dr. Parker is always on the cutting edgeof research. He's always involved in so many different projects. It's amazing. And PCOS is very much high on his list of projects to learn about, and we are so lucky to have him join us.

So tell us all about yourself and all about your cutting edge research involving PCOS and how you got interested in the whole topic. Yeah. Thanks, at some Well, I've had an interest in health for probably over 40 years now, and I've been watching this space and looking at research and talking about and learning about it. Over those years.

When I was in general practice, I started having an interest in screening for picking up disease early, like screening for cancers like pap smears and bowel screening and those sort of things.

And that subsequently led me to looking at evidence based medicine. And that's what I've always been trying to do, is apply the evidence to clinical practice and often takes a long time to get research from the bench to the bedside.

And that's sort of what I've concentrated on in my time in medicine. I was involved in the initial part of the laparoscopic Rose Revolution where we changed from laparotomy or open surgery to keyhole surgery.

I was involved in the first clinical trial in Australia on stage of fibrinogen, as if using it as a predictor for preterm delivery and preterm labor and that's got a long story behind it.

And we're we're still currently using that test in clinical practice, but probably about ten or 12 years ago I started to see a lot more adolescent girls with polycystic ovary syndrome in my practice, in my clinical practice.

And it got me thinking like that would go away, get the testing, come back and ask, Well, what is polycystic ovary syndrome? And that got me thinking about answering that question properly.

And I started to research and I started to look at the literature and I started to go to conferences and particularly focus on that aspect. And pretty well that's what I've done the last 10 to 12 years since I started that.

I think the interesting thing about polycystic ovary syndrome is because it's such a wide spread problem in the body, affects all areas of the body where there's some nervous system, the reproductive system, the hormones, metabolism, which is the way we might use and store energy.

Polycystic ovary syndrome really affects everywhere in the body. And what I found interesting about it is what did you learn about polycystic ovary syndrome in terms of the physiology and the anatomy and the biochar chemistry

and all of the medicine?

It applies generally to the rest of medicine. So it's not as if you're just focused on a single little problem. When you learn about polycystic ovary syndrome, you learn about everything that's going on in the human body.

And that's what interests me that that sort of general understanding of the human health and disease. And in fact, I don't really even look at polycystic ovary syndrome as a disease.

It's really a disturbance of the things that maintain health. And I can talk about that a little bit later on, but so I've basically had this interest in PCOS now for over a decade, published probably 13 or 14 papers in the in the literature on various aspects.

And my current focus really is on something that's not very well looked at or spoken about or talked about much. And that is the question of why do women with polycystic ovary syndrome have an increased risk of pregnancy related problems?

And again, I'd like to talk a little bit about that later on in the interview. If we've got time to do that. Well, I will make the time because this is so important.

Evolutionary View of PCOS

Let's talk about I know you've written a paper on this topic, the evolutionary basis and the whole evolutionary medicine portion of PCOS. Can you talk about what that even means and and how that relates and what people should know about it?

Yeah, evolution is a way of getting a story and providing a perspective on human health and when when we sort of we tend in medicine to look at our problems a little bit in isolation and we look at ourself as humans a little bit differently to the way that we look at animals.

But really what we need to look at is how we as humans interact with our environment, how does our genetics set us up for either maintaining health or developing disease?

By the way we interact with our environment? And that really all comes back to lifestyle, which most people are aware of with now, with polycystic ovary syndrome, there's a massive lifestyle component that contributes to all of the problems that develop in women with polycystic ovary syndrome.

So I think what looking at the evolutionary aspects of polycystic ovary syndrome give us a much broader perspective. And it allows us to look at the question why?

Why do women get polycystic ovary syndrome? Because mostly we strive for some or what is it? It's a problem with acne and irregular periods and and then we focus in research on, well, how does that happen?

How do these hormones bond with their receptors and how do they cause these changes? We don't look at why and people and patients and doctors ourselves.

It's nice to have a story. It's nice to know why and even if it is a story that's a work in progress, because we can never prove anything with evolution.

It's always a story that's a work in progress. It gives us a base to work from and it allows us to see this interaction between ourselves and our environment.

So basically all species have got a set of genes that are very well aligned with their environment. They've developed over millions of years and gone through many different species to set us up with the basic biochemistry and metabolism and physiology that that that keeps us healthy.

And obviously that genetic blueprint has all the instructions and all of the ingredients that we need to be healthy. And it's our job then to go out into the environment and, and source those things, those ingredients, and make decisions about what we do with them so that we can then influence our genetic, our genes.

So an evolutionary way of looking at things is that we're very well adapted to the environment that they were in. We're in as a human species. We need certain amount of nutrients and ingredients vitamins, minerals and proteins and carbohydrates, and then that will give us a good base for maintaining health and preventing disease.

So in evolutionary view of polycystic ovary syndrome really tells us that we need to live in balance with our environment. Now, the the particular model that we've developed and published on really is based around the fact that what we've got with polycystic ovary syndrome is a mismatch between our ancient genome, the genes that we've inherited over thousands and millions of years, and the environment that they were set up to protect us from and defenders against starvation, infection, predators, all the things that happened to us in that environment.

Basically, we've got a mismatch between those genes and the lifestyle and the current environment that we live in. Obviously, the environment we live in now is not the environment that we've been evolved and adapted to live and survive in optimally.

And we've got obviously access to highly processed foods, you know, high carbohydrate, high fat diets. We've got sleep disturbance messages, the amount of stress in modern life.

So we've got all these lifestyle factors that really we're not adapted to and our physiology is not adapted to. These are all things that put our physiology and our metabolism out of balance.

So what we've got to look at within this paradigm is how do we reset some of those things? Because obviously we don't want to go back to living in a prehistoric environment.

What we've got here are libraries, big predators chasing us and no access to a doona. You know, we want to live in the current environment. We've got to work out some way to balance a modern lifestyle with our environment.

And that's really this evolutionary mismatch theory. Our genes haven't changed much, but our environment has dramatically changed. Well, you and I speak the same language.

I talk about the same exact topic all the time, about the change in our environmental toxicant exposures, our dietary changes, our circadian rhythm influencers like, you know, too much light, too much television, too little sleep and, you know, just all the different aspects of modern life which make life very fun in many ways, but actually very unhealthy.

But I was so interested in one of the things that you mentioned concerning like ancient people. So now in evolution, you think that genes that are not really helpful might be weeded out through evolution.

So is there something that may be advantageous about the genetics that really cause every single woman doesn't, although to many, but every woman doesn't develop PCOS, even if they live the same, sort of, we'll say altered lifestyle.

So what is it that may be within the genetics of women who are at risk to develop PCOS? That maybe could have been an advantage maybe in ancient times or or why do you think if we even know how it is that women who have this genetic predisposition in our modern world to develop PCOS actually continue to reproduce and that we have this risk factor?

I think that's very, very good question. And now I think that's a question that many women with PCOS would like to know the answer to as well. The way I think of it is that women with PCOS are really the metabolically elite group in our society because they have got a set of genes and we know this there's about 20 to 25 genes that women from different populations and with different kinds of PCOS actually have.

So there's a cluster of genes, but they're all normal genes, they're just very good genes. So they're good genes for putting on weight.

Genetics, Lifestyle, and Metabolic Elite

They good genes for processing sugar and for developing insulin resistance at the appropriate time. And insulin resistance is actually an adaptive survival mechanism.

Even in in ancient populations, obviously there was periods of starvation and food shortage and people have to use their adaptive survival pathways to get through that.

And women with PCOS have got genes that allow them to implement insulin resistance, keep their blood sugar high, and also in times of deprivation. But in good times, those same genes allow them to store energy, put on white in preparation for the lean times.

So my way of looking at the genetics of polycystic ovary syndrome is that these women with polycystic ovary syndrome are really the metabolic elite. The problem is we're not in an ancient situation.

We say deprivation and brace shortages of good food supply. We've got 24 hour a day access to packaged, processed, ultra processed foods that are high calorie, tasteful, addictive, and that we all want to get as much as we can.

And we don't have any genes for self-control in that situation because we never had to do that. We never had to develop that sort of situation. Whenever we found, for instance, seasonally a seasonally available fruit, we could gorge on it and eat it and it wouldn't be there for long.

And the adaptive survival mechanisms that our genes set us up to use then are now being used in a maladaptive way so that obviously women with polycystic ovary syndrome, the majority, 80%, put on weight and become overweight and obese.

They develop insulin resistance and then they're at more risk of getting gestational diabetes in pregnancy and diabetes later in life. So again, it's this mismatch between our ancient genes and how they were set up for adapted survival mechanisms.

And the exposures that we're getting today with all of our food, with all of our lifestyle, our endocrine disrupting chemicals that are activating all the pathological processes like insulin resistance and chronic inflammation that were adaptive in one environment but are now praised predisposing us to disease.

So all people have got the genes to do those things. That's why the genes for polycystic ovary syndrome a normal it's just some people that's got better genes for putting on weight or not putting on weight.

And other people are better at athletics and not at athletics and all of the other human traits that we have. So women with polycystic ovary syndrome to me have got a cluster of genes that that are really set for survival in in an ancient environment.

And that's why they've continued to get passed down, because they are they are adaptive from an evolutionary point of view. Is that good? That you know, I think that that message needs to resonate with every one of the viewers out there who suffer with PCOS, that you're among the elite, right.

If you can only return to something close to the lifestyle that you were metabolically adapted to, you know, the right types of food eating at the right time, sometimes not eating, sleeping at the right times, the right amount of light and lowering the exposures to all of those environmental toxicants that are disrupting hormones and creating obesity and insulin resistance and so on, you can return your body to a state of metabolic homeostasis, that sort of balance state when your intake of energy matches what your body actually needs, right?

So you can actually be healthy in all aspects of your your body. And so this gives everyone hope, right, that they can actually make changes with real beneficial consequences.

But recognizing that the way it is right now, until women with PCOS who have these metabolic imbalances, that they actually take all these steps to right their their lifestyles and so on.

You mentioned things like, you know, obesity, insulin resistance and along with that would come things like inflammation and so on. And of course, these are the predecessors of complications in pregnancy.

So let's jump into what is going on in women with PCOS. That, number one, they of course, have the highest rates of INFRATIL 80 of all reproductive age women, and they also have the highest rates of these pregnancy related complications that relate to all the things that you were talking about with, you know, energy distribution and obesity and inflammation and insulin resistance.

So let's do a little deep dove into what's going on there with the whole reproductive aspect of PCOS. Yeah, thanks for leading into that. That's to me, that's a really important thing and actually that's become quite a neglected area in the care and in the discussions around PCOS, you don't really see it.

For instance, if you do research the literature on the risk factors in pregnancy for pregnancy complications, you very rarely see PCOS listed, but then it's at least a moderate to high risk factor.

When you do look at the evidence that is available and I come back to that a bit shortly, but I think it might be helpful for the viewers if I just present a very brief case to to demonstrate some of those points.

So a patient that I saw was a 20 year old woman. She'd been living at home, finished her high school, and she'd have pretty regular periods, a little bit overweight, was eating quite well with her mother's food.

Then she went to uni. The next year she got into uni shows, all excited. She was living by herself in a in a university accommodation, started eating packaged and processed and junk food, staying up late at night, studying stressed by just being in the whole environment and trying to work it all out, not getting sleep, staying on the computer too late at night, eating chocolate and basically not exercising and not being very active at all.

And over that first 12 months, she put on take loads, have periods became irregular, she developed a lot of acne and she actually got pregnant along the way and then had a miscarriage.

And so towards the end of the year, she went to see her doctor and said, Look what's going on and I've got all these things happening. And the doctor sent her after some tests and I'll just list some of those tests without explaining what they are.

I know a lot of people will have heard of them. She had an increased LH to switch ratio, increased testosterone, increased free androgen index, decreased sex on hormone binding Robyn and then increased fasting insulin all abnormal.

So she had insulin resistance and she had all the diagnostic changes of polycystic ovary syndrome. She went back to the doctor. The doctor said, well, he's got polycystic ovary syndrome and tried to explain to her what that is, which is for a lot of doctors and health practitioners.

PCOS, Fertility, and Pregnancy Risks

Quite a difficult thing to explain because it's it's just such a it involves so many parts of the body and it's hormones and it's metabolic and no one sort of knows where a beginning begins or ends.

And we know it's got something to do with lifestyle. So people often end up a bit confused when they get those sort of discussions and diagnosis anyway, she was very clever.

The 31st of December, New Year's Eve, New Year's resolution. I'm going to turn this around. I didn't have this before. I'm going on a diet. I'm not going to eat all this junk food.

I'm going to start going to the gym and exercising and turn off my computer at 9:00 at night and get some sleep. So all of these other things that we've spoken about and she did that over the next year and throughout the year, she lost 20 kilos periods, became regular again.

She didn't get pregnant again, but she didn't want to get pregnant anyway. So that was good. And then at the end of the year, she went back to her doctor and she said, Well, I've been doing all these things.

I've felt good. Can you do those tests and check me? So the doctor does all the exact same tests again. She goes back to get the results. They're all normal now, I think is so.

She doesn't have polycystic ovary syndrome at the end of her second year, the end of her first year, she had a diagnosis of polycystic ovary syndrome, a disease.

At the end of her second year, she was normal. And that to me demonstrates the power of what you can do with lifestyle. And it also reminds us that all of the changes, the acne, the irregular periods and even the increased pregnancy risks can be treated with lifestyle.

Not everyone is obviously as successful as she was at implementing all these changes. That is the really difficult thing. The polycystic ovary syndrome is a disturbance of the hallmarks of health.

It's not a disease. The things that keep us healthy, all our adaptive survival mechanisms that we've evolved over millions of years, all the things that keep us healthy if we have an unhealthy lifestyle with all the things that we've mentioned we disturb.

That is hallmarks of health. And this is quite a different way of looking at disease and health than what we've previously done with not with in the past.

We've said that will health is an absence of disease, which implies that that disease somewhere starts in cells and through genetics or some abnormality in your cells and then spreads to the rest of your body and causes all the symptoms and problems.

So in this new paradigm that's coming through, the hallmarks of health is the way we look at it from an evolutionary point of view as well. We are set up with the genes and the survival pathways to keep us healthy.

It takes a lot to disturb that and make us unhealthy in terms of our interaction with the environment and our lifestyle. So I think to me that case demonstrates very clearly how the evolutionary aspect does help understand what polycystic ovary syndrome is, that women with polycystic ovary syndrome have got control, and when they have the knowledge about what is going on and understand these sort of new paradigms, they can take control of their own health and destiny and decide what changes they are able to make within their own lifestyle to to get back to health that's been disturbed by whatever previous lifestyle things that they've been doing.

So I think that this this way, this new way of thinking gives women power and control. Absolutely. And I echo your case study with many that I have seen in my practice.

I mean, this is, you know, music to my ears because this is what I practice in my office. And this is not typical. And I know that's why, you know, I immediately bonded with you when we met in Australia so many years ago because we both knew right away, even though it's not talked about, like you said, that this is something that can be correct did but not with a magic pill, but with a change of lifestyle and all the different things.

And the fact that you had this patient who actually implement and did all the things that we talk about people need to implement is really so powerful that within every person they had the power to transform their lives.

And this is like so amazing because I know here in the US everyone's looking for the magic pill solution and I keep saying, you know, that for women with PCOS who want to get pregnant, they often go, as you know, I'm sure it's very similar in Australia that they go because they can't get pregnant because they don't have cycles, they're not ovulating and they go and they get put on maybe a three month starvation diet when they go to the IVF fertility center and then they're given IVF and they're not really healthy.

They're not healthy at that point. And then they end up with all these pregnancy complications, oceans and or they get miscarriages at a very high rate, or they're unsuccessful because women with PCOS have also the highest rates of failure from having IVF treatments.

So I emphasize and obviously you do too are on the same page that before you even try to conceive and if you have to go and have assisted reproductive technology used, that's okay if you've tried all these other things and it's necessary, but get healthy first because pregnancy is the ultimate stress test for women.

And, you know, we talk about that, all these pregnancy complications now we recognize if women have them, it's a red flag for the future, like when they go through another metabolic challenge, like the menopausal transition, that they're the group that are most at risk for developing hypertension and diabetes, cardiovascular disease at that time in life, if they've had these pregnancy complications and it's so avoidable in such a high percentage of women and pregnancy complications are really just astronomically common now.

And we now know that like you talked all about, gene expression, the environment, intrauterine is going to have a big effect on the gene expression for the baby that's developing.

And then those the offspring have metabolic problems in childhood and then throughout their lives. So the takeaway message is so powerful that you are giving that you can do this.

Everyone has the power to change things and make their lives so different. And I thought maybe you could just mention a little bit about inflammation because that word is tossed around so much.

So what's the relationship of inflammation and complications of all sorts? Yeah, well, I can tie that in with the with the comments you just made on pregnancy I think pretty well when you think about those pregnancy complications, miscarriage in the first trimester is common anyway, 15 to 20%.

But when those PCOS have double that risk, 30 to 40% miscarriage rate and they have 2 to 4 times the risk of growth problems in the baby and pre-eclampsia, and you think, well, you would immediately think, well, why?

Why, when you're thinking from an evolutionary perspective, not how and what you think you might, well, why would this happen? And from as soon as pregnancy starts after fertilization, when the egg and the sperm come together, and then the first cell is formed and then doubles to cells for cells, eight cells, etc., That developing concept US has to get nutrition from the mother and it's getting that nutrition from the fluids in the mother and that fluid is produced by the glands in the endometrium or the lining of the uterus. So just to jump forward to what you said, if you have insulin resistance, metabolic problems, problems with your hormones, in other words, an imbalance of estrogens and androgens, which is what women with polycystic ovary syndrome have.

And you have chronic low grade inflammation, which is a big part of polycystic ovary syndrome. All those things are going to slip reflect in the fluid that's produced by the end of Natrium.

And that fluid then is feeding and interacting with the developing embryo. And common sense would tell you that it's going to have an effect. Problem is that we in medicine, we like evidence and it's very hard to get evidence from what's happening in a pregnancy in the uterus as we don't normally get access to that by, for instance, taking a biopsy and looking at the cells.

The latest area of research is called Organoid Research, where we grow different organs in a laboratory and we don't actually grow the actual organ, but we grow the cells of the organ and we can experiment on them and test them.

Look at their genetics and look at their metabolism and a whole range of things. And we can do that with the brain, the kidney, the lungs and the uterus.

Inflammation and Endometrial Research

So the latest research in pregnancy research is all around this organoid research where we can take a biopsy. And for instance, I'll tell you a recent study that took a biopsy from women that were normal of the uterus in the endometrial lining and from women with polycystic ovary syndrome, grew up those endometrial organs in the laboratory under specialized conditions and looked at the genetic expression, those genes that we know that women with polycystic ovary syndrome had, etc., and they found that the genes in women with polycystic ovary syndrome were abnormal.

They expressed and different to the women that didn't have it. So then they went and treated the women with polycystic ovary syndrome for 16 weeks. The lifestyle, all the things that we just said, they took them back, took a biopsy, then to make them regrew up the organoid the tissue looked at the genetics and it was normal, the same as the women who did not have polycystic ovary syndrome.

In other words, what we just said in that case history that that university student did by reversing all of her pathology and symptoms of polycystic ovary syndrome with lifestyle and diet, we now know affects the endometrium and that affects the nutrition that the embryo is going to get.

And later, the placenta, because the placenta doesn't really function properly. We know that now until after 12 weeks, up to 12 weeks, the embryos getting pretty well, all of its nutrition through the fluids that are coming in to the placenta, not through the blood supply from the mother.

That starts about 12 weeks properly. So what we know now from these organoid studies is we can reverse the pathology that's happening in the uterus. Now, what we don't know, because the research hasn't been done yet, what happens if that university student reverses all her symptoms and pathology?

Then we do a biopsy and it shows that it's normal. Will she have a normal pregnancy and and a reduction in pregnancy complications? Well, I think we can jump ahead a little bit and use a bit of common sense and say, well, it's going to be extremely likely, but those studies haven't been done yet.

So not only can we take a reversal, we've seen and many times and you and I in clinical practice, we've seen women do this many times, reverse the symptoms in their pathology, and hopefully now will be starting to move into an era where we can actually prove and get evidence to show that that's doing that is going to reverse pregnancy complications and bring women with polycystic ovary syndrome back into the normal risk profile.

So to me, that that emerging area of research, it's really only been happening in the last five or six years is very exciting. And it should just the thought of all of that should give a lot of incentive and hope and encouragement to women with polycystic ovary syndrome to spend at least 3 to 6 months before they get pregnant doing everything they possibly can in all those different areas of lifestyle to get their diet, their exercise, and their weight and the metabolism under control before they get pregnant.

And then they should be the same as everyone else in terms if they don't, if they go into pregnancy and none of their tests and none of the symptoms of polycystic ovary syndrome are there, surely they're at the same risk of everyone else.

So to me that this new emerging research is just another area that supports everything. We're thinking about this evolutionary model, this new hallmarks of health, and the great impact of lifestyle, which is really just the interaction between our genes and the environment.

We're just the mediators in the middle of that and make the choices. The problem is we are continually faced with bad choices that a palatable and an easy and easy to easy to make their own decisions. And anyway, I see I see a lot of hope for the future now and trying to get a little bit more recognition for polycystic ovary syndrome as a

significant risk factor among obstetricians and perinatal adjusted to doing the research and and looking at this area of medicine.

So I think it's a very bright future. Well, I'll say that is some of the most interesting cutting edge research that I have heard in a long time. And I'm so happy that it's happening and I'm so excited for the future.

I mean, you and I intuitively knew that lifestyle had to have an impact, but we know how it works. You have to prove it, right, that you have to do the studies to show.

But in the interim, like you said, let's use our common sense. We don't have to wait for those studies to come out and be finalized and done to say, let's make the changes now.

Right? We know that we have to do this. And every woman who wishes to have easy pregnancies, a healthy baby, and of course, reduce her risk of all sorts of complications, optimize fertility and optimize healthy longevity because this is her body for the rest of her life can take heed.

With all that you have shared with us, it's so exciting that things like eating the right foods and looking at your environment and all those factors and it's so, you know, upsetting when I know when I read, just like you do, the percentage of processed food that is composing, what people's diets are these days.

So I always say in my practice to patients, if it was unavailable to be eaten by your great grandmother, don't eat it, you know, just eat real food from the earth, you know, as much as possible or organic, you know, go to bed, you're diurnal.

You're not nocturnal, you know, turn the lights down, turn off the TV, the computer, get out there, see some sunlight, look at the trees, get some exercise.

All the things that seem so obvious, but yet they're not being done and the outcomes can be dramatic. I mean, it's like phenomenal. What can happen when you make these changes.

I can't thank you enough for joining us.

Practical Lifestyle Advice and Closing

Everyone will benefit even if you don't have polycystic ovary syndrome, get get real about your lifestyle. Make the changes so that you can be optimally healthy.

And if you have PCOS, you want to have a baby do everything that Dr. Parker said. Don't just jump in and try to get pregnant. Wait that little bit of time to optimize as your health it will pay back thousands fold you know in terms of the benefits and I know that there are people out there viewers who say I want to learn more.

So if they can like know, like where can they either reach you or find more information or just how can they learn more about what research you're doing and say they want to know more about any of the topics that you discussed.

Any suggestions. On My research can be accessed on ResearchGate and on Google Scholar and things like that, but really I would recommend that they go and watch your podcasts because your podcasts cover every area of PCOS and I watch them all and I learn a lot from those and they're easily accessible, they're easy to understand.

And my recommend, my, my research is written in medical terminology and things. And that's because I'm no longer seeing patients. I'm more actively involved in research.

And so that's where I'm putting my effort, for instance, into this these new areas. But from a practical point of view, I would definitely recommend people go to your podcast.

So that's, that's my recommendation and I'd probably finish with it. Just one small thing, and that is the question I've been trying to answer to try and make it clearer to myself and patients what is polycystic ovary syndrome and my short answer to that is that PCOS is an inherited problem resulting in symptoms such as irregular periods, acne and excess hair growth that big that can be controlled by attention to diet and other lifestyle factors.

And to me, that's a simple explanation that covers the evolutionary things and the lifestyle and the symptoms and brings it together in in what should be a pretty understandable way for most patients.

So I'll finish on that note. Well, I love it. And I'm just going to add one more topper. And that is, remember, you have the elite genes, right? That's healthy.

You were born to survive. So let's take advantage. Go back to the lifestyle you were born with your genes to live. And thank you. Thank you so much and I look forward to working with you in the future.

We've got many more articles to write together. Great. Thank you. Thank you.