Introduction and Career Background

James B Laval is an internationally recognized clinical pharmacist, author and board certified clinical nutritionist with over 35 years of clinical experience.

Jim is best known for his expertise in performance, health, and integrative care with personally seeing thousands of clients over the years. He is the founder of Metabolic Code Enterprises, a cloud based assessment tool that helps to pinpoint where the metabolic roadblocks are to a person's health based on their symptom survey, lab markers, biometric and wearable data.

The tool helps prioritize care for individuals using a point system to indicate areas of metabolism that are the most in need of treatment. Jim gained national recognition as National Clinician of the year in 2012 by the Natural Products Association for his pioneering work in furthering the professional standards of integrative care.

And in 2017, as educator of the year for the American Academy of Anti-Aging medicine, Jim was appointed the Clinical Director of the Pro Football Hall of Fame Performance Health Program, and he is the author of 22 books and 16 ebooks, including the bestselling Cracking the Metabolic Code and Your Blood Never Lies.

Well, it's great to have you here, Jim. I'm really excited for it to start this discussion because of, the fact that you've been in this field for so long, a longer than I have, actually, taking care of patients, and, all sorts of things, as we discussed in your bio.

Maybe we just get started by you having the tell me a little bit about your journey over the past 30 years. And sort of where your philosophy is at this point.

Well, sure. Well, you know, it's interesting. I was very active, as a, as a high school athlete and, you know, became a Division one scholarship, athlete.

I got injured before I even got into my first day of practice. And, that got me thinking differently. I thought, well, I guess I can't, strain my muscles.

I better start straining my brain a little bit in order to make a living. And, so that really my cousins were importing products from Germany. Nutritional products, homeopathy, drainage formulations.

Back and then early 1980s. And, and I was going to pharmacy school at the University of Cincinnati, which was founded by Lloyd Brothers. And Lloyd brothers actually were a pharmaceutical house that were world renowned for their extractions and botanical medicines.

So I actually took Pharma C and our organic medicinal biochemistry, which rooted me in this thought that what we really come down to when we're trying to help someone get better is we're trying to change the signals.

Right? It's it's all about what we tell, our cells to do that is going to dictate really how we feel. And that doesn't matter whether we're angry or stressed or not sleeping well or taking metformin or taking ashwagandha, or using a peptide.

Everything ends up coming down to that signal. And I kind of got that pretty early on. While I was going through school. And it actually what generated, you know, all my interest in this was I was, you know, I came right out of pharmacy school and, and, I was behind the counter three days.

Lady came up to me with a prescription for for, diabetes medication at a very rough neighborhood because I was bodybuilding at the time. Was really big and said, hey, we'll put him in the tough neighborhoods.

No big deal. And and, she came back with her grocery cart. It was the end of the day. And I looked in our grocery cart, and I looked at the medication I was giving her.

My whole family was riddled with diabetes. My grandmother, a fingerless, toneless, blind, diabetic, my father, my uncles, my aunts. I really get this disease.

And I said, can I show you a couple foods? And, I actually went from behind the counter, which I wasn't supposed to do, but three days on the job, what the heck?

You don't know, right? And, so I went and showed her some foods in a very tough neighborhood. Very, very poor neighborhood, actually. And, next two weeks, I had a bunch of people showing up for a grocery store tour.

After that, I thought, well, maybe we should tag foods and tell people about what's good for their diabetes and good for their heart health, and test them for blood sugars in their grocery store, which was the Kroger, pharmacy and grocery chain.

We ended up finding more new diabetics selling more glucometer and creating, the first approved food tagging system that created millions of imprints a month on how people shopped and influenced and the reason I tell you that is that I really have this core belief that, you know, we have to reach out and help one person at a time, and that end of one can create an end of a million.

And I think that that and of a million needs to happen with the way we think now about how do we approach health from a cell biology or a systems biology perspective?

And, you know, and I just think, you know, it started there and then it, it, it rolled there. Right. You know, after they said, great job, kid. Get behind the counter.

I started working in clinical practice. I, I started going to seminars. So in 1985 I started going to seminars and working in a and a doctor's office, unwinding people's chemistries and helping to teach them about how they can take control and empower their health.

And now that led to the 22 books and four databases and all the stuff that I've done in the in the last 38 years, and, you know, being the co-chair at a forum.

But I think that's that that really is what got me into the position of how I think today, which is, you know, we have the genes. We were given. And, you know, I'm a good example.

I don't have good genes. I mean, I it's it's actually kind of nasty. And, but I'd have to say that age 61, I'm a pretty darn good health. And I think that it's about evaluating.

And I think I've let a lot of other people to good health, which I, and, and, and I think evaluating what are the metabolic issues that are in, in, in, in, in an individual that, that creates the roadblocks to maintaining their homeostasis, turning off that chronic inflammatory signaling that leads to the damage of telomeres leads to where cells start to become obligate, you know, sugar energy utilize ERS.

So more like, the Warburg effect or pre-cancer cancer cells, which ends up being what starts to damage DNA and starts to cause problems. We get this metabolic, and I really have to thank you.

From Pharmacy to Food as Medicine

I wrote a wrote a chapter in a book called Diabetes and Cancer Epidemiologic Links and Molecular Evidence. And and it was really just going, you know, cell by cell in and within the cell.

What are the decisions being made by your cell that lead you to damaging your DNA, lead you to that oncogenes lead you to that that disordered inflammatory signaling.

So that's kind of the, you know, the the 38 years and three minutes, maybe five minutes. Well, I did not know, that all that earlier stuff that's very, very much a pioneer in the, in the food, sort of food is medicine, movement.

And really right at the grocery store level. That's that's a fascinating story. In terms of where you are now, you're I know you have a whole platform for sort of analyzing the single to talk a little bit about sort of what the what the approach is now, the modules and how you, evaluate an individual to sort of then help them turn things around if they're, you know, in a bad aging trajectory.

Oh, sure. So, you know, after going through, I mean, seeing 3 or 400 patients a week, at the Institute in Ohio, my current office is in California, and I actually live in Texas, so I have other clinics going around.

I just kept seeing repeated patterns over and over again, and, I, you know, and it was always difficult because, as you know, when you practice, you know, the classic model is patient comes in, they go to somebody doing functional, regenerative or energy medicine, whatever you want to call it, you know, something different than traditional medicine.

Now they're given a stack of 30 pages of, of labs and you got scribble on it, say, and this is good. This has to come down. This is your PhD. Don't you realize how bad this is? Right?

We give them this stuff and we think they're going to remember everything that a we're enthusiastic about or be that they've been trained in molecular biology.

And neither one of those things are true. They just know they don't feel good. And they want to feel better. And so I think that I, I like looking at genes.

I don't do a ton of, you know, emphasis, here's what your genes sort of say. And therefore you have to take these nutrients because I think that's that's variable based on what your expression is like, what your epigenetics you're doing.

But the basically when we develop the metabolic code, cloud based platform, it was to say that your body works in networks. And we created these networks based on what the scientific literature said.

So we have five networks that all of your information dumps into. And and so it's these five architectures we call triads. They're actually metabolic types, you know.

And that's a term it's used in the literature. Amitabha type. And what we're really trying to measure is what is your metabolic reserve. What's your capacity.

What's your durability. Where are you at with allostatic load. Because in the end, we all know there's that straw that breaks the camel's back. And you know, you end up with a disease.

But there's a lot of people out there that are in the great nether world of almost an illness, but not quite diagnosed yet. Or if we start to think about aging as a disease, we want to try to keep markers as optimized as possible.

And so basically you do a questionnaire, you do labs, you do biometrics, you can put in your wearable data. All that stuff falls into these five buckets.

And the purpose of it is, is to define, well, where should I start. Because when I, you know, I've taught at a forum and been the co-chair there for, oh my gosh, 15 years.

And I think a lot of times, you know, docs get afraid to get started. And I have to say one thing that I wasn't afraid of back in 1985 when the fire got let me was I just wanted to jump in because I figured I went to a seminar that weekend, and more than likely, the person sitting in front of me did not go to that seminar.

And I'm going to at least have some information to share that could change your life. Right? And so I wanted to

create an inertia and that and it's simple.

It's, you know, the first metabolite type is adrenal, thyroid, pancreas. How cortisol, glucose, insulin and thyroid interact. When it's interacting, good energy is good.

When it's interacting poorly, you gain weight and you get tired, right? That right. And that and the next right. And the next one is gut immune brain.

And so that's about resiliency. Where's my immune system map. Do I have you know, do I have, you know, improper bugs in my gut. Do I have Sibo. Am I getting enough fiber?

Am I processing my hormones and my anxious am I nervous? What's my enteric nervous system doing? Is my immune system in balance, or am I more in an inflammatory response?

And that can be decided through, you know, I think importantly, questions that people answer and then get those subsequent labs that would prove that.

And the third being cardiopulmonary neurovascular, which is, I once again accepted when you went through school, you we all learned about the cardiopulmonary neurovascular network.

And that's all about endurance and stamina. You know, what's my heart rate variability is my, you know, as we saw in the pandemic, you know, Covid long haulers with Potts syndromes and heart rate variability issues because their central nervous system through the neurovascular tree and immune dysregulation cause the problem for that.

And so that's three. And four is liver lymph kidney. And simply for the layperson that's for detox. But you know obviously it's anemia kidney function.

Now we don't put enough emphasis on the lymphatics and what they're doing. Right. And then of course, the fifth, it's about hormones and hormone balance to me means potency, potency in the world.

If you're a woman, you want to feel desired. You want to feel like when you walk in the room, you're, you know, there's a tension that you're, you know, and for men, it's that, hey, I want to feel like I can still protect the home and now change my tire.

Right. And we know now that, you know, in terms of, like, giving hormones a good, good, study that was done on glycans, right? I think you're familiar with that study.

I just I just, interviewed Gordon less, the founder of, like, an inch, so. Yeah, that's a complete, groundbreaking study that, validated everything that we've been doing for a long time.

And I think we'll change the landscape of HRT again. 100%, I. I was just floored by, Gordon's just seminal research. Phenomenal research in this area.

And I think it's going to reshape the landscape along with telomere testing along with DNA methylation as we start to look at, because I want to we always have to be careful about choosing the one marker, right, 100% agreement with you.

I mean, that's what the NIH was looking for. Everybody's looking for the one biomarker amazing that uncovers that underlying aging process. And I think, you know, the field is really moving to the point where now it's not a single biomarker.

And it's not because we haven't found it because it doesn't exist. If you want to measure how each system is aging and people, I mean, like you, I measure all the aging systems in my in my patients.

And what I'm really, astounded by is how differently they can age in one system versus the other, dependent on a

combination of genetics, lifestyle and of course, how lifestyle and diet, etc., affect epigenetics.

You know, when patients sort of like my cardio age is 25, but my neuro age is, you know, 50. How is that possible? Because you drink too much and your brain is not working that well, but you do work out. So your arteries are doing better.

I mean, and that's and to try to put that all together in one thing, you know, the DNA methylation ages, they give you a very tight correlate correlation with chronological age.

And it used to be thought, well that's that, that's that's fantastic. But now they're, they're training them on other data, not just chronological age because you want to pick up these other things.

If you have a perfect biomarker of aging predicts biological age perfectly, it's useless because you already have the age. So yeah, we're completely on the same page with that.

So go ahead. You know, and I think, you know, for me, what was always important is looking at metabolomics markers. So I'm very interested I want to know what you're fasting and two hour postprandial insulin is I want to know how adaptive your body is when you're challenged.

Right. So that's our whole concept of allostatic load. And as we were talking before the interview, now I work on two populations of people. I mean, I talk with, you know, I've lectured special forces researchers, I've worked with, tactical groups.

I've worked with professional athletes. But the majority of my practice is, hey, I'm an executive, I'm getting burned out. I'm feeling like I'm on the brink of really, you know, not being able to complete my mission here with my with my company or, you know, or it's, it's a it's a mother who's also working and, you know, as a professional.

Or it could be anyone, and I and I think that if we if we get away too far from these hallmark or benchmark markers like oxidized LDL and Milo peroxidase and deoxygenation as the markers that are telling us, what am I doing that is going to influence that for example, glycan age or true age?

Metabolic Code and the Five Core Networks

I know for me, when I get true age, I'll just tell you, you know, real quick, have my DNA done and basically, I was talking to an expert in it and I said, wow, you think I could have been dealt a couple good cards?

I mean, it's one of those deals when you're in a poker hand and you just throw it in right away, you know, you're just like, okay, this is over. And if I look around my family, my brother, you know, died, at 64 and was 476 pounds at one point.

My mother was obese, had all those obesity genes, diabetes genes, you know, poor detox genes, all that stuff. So I'm thinking, well, this is terrible.

Then I did my true age. And I'll tell you why it's important that I think we do these tests, because even for me, I mean, I've done this on 100,000 patients.

I mean, you know, I mean, it's not like I still get excited about changing somebody the way they feel. Most importantly, like when they come in and they go, you know what?

Gosh, I'm pooping. God, I'm not stressed out. I'm sleeping better. Guess what? When those things happen, you're epigenetics. You're going to get better, right?

So for me, I did my my test. And when I, you know, kind of talk to the expert, on staff and they said, wow, you know, you're 61. We never get a 61 year old male in the U. S.

The test below their biological, their chronological age. Most of the time, they're beyond because of all the damage. I mean, you're, like, in the 90th percentile here.

This is pretty good, right? Well, it it was great, but it really showed me. Was it. It's kind of like, when I've really. You asked me early on, what am I into now?

I'm really trying to get people to stop thinking about, oh, I have to be on a diet or oh, I have to think about taking this supplement or, oh, I need to take my hormones.

I want I want them to think about what lifestyle is going to give you, the outcome that you're looking for, and then how committed are you to making those things happen for yourself.

Because in the end, you're the captain of the ship. You you have to say this just isn't a diet where I'm having foods taken away from me. We know now that when you eat foods that are inflammatory, I don't mean just gluten in cows dairy.

If you have food allergies like, you know, CD3, BD, or IgG4 allergies, you're stressing your immune system and you're causing problems with your, you know, your your DNA methylation.

You're creating inflammatory chemistry that's going to damage your tissues at several levels, whichever way you want to measure it. And so, the biggest thing I'm trying to kind of even now, you know, 38 years later, I'm continuing to evolve how I try to explain why it's important that people make these decisions and not just, you know, you need to do this to get yourself out of the trouble you're in because you came to me because you were in trouble.

Yeah. I mean, I always tell patients, that it's at best 60 for you, but probably more like 70, 80, 27, you know, 30, 20. You know, how much they do versus what I'm prescribing and telling them to do?

But I do think that giving them the markers and rather than saying, you know, everybody should eat a, you know, a lower fat diet, you know, this is what a higher fat diet is actually doing to you.

And, you know, you need to you need to start to address this. And when they see that like or if they see their corner and calcium score is high, even though they, you know, they're completely asymptomatic, that then changes behavior.

Yeah. So, you know, just regular nostrums about what are healthy behaviors. Most people are like, oh, I'll take a chance. It's probably not going to be me.

But then they get their eyes open and then, you know, then they have certain things where, you know, they're doing they're doing great, and they feel good about that.

So I think I think, you know, you're right. It is. And when the when patients do. Well, you know, I say, you know, you're like, you're making me look good.

It's not so much that I'm making you look good. So I think that's that's absolutely right. I mean, our audience is this for this? Some of this is going to be mostly health care practitioners, physicians.

So, and I know that you've got a great system for making it easy for both the patients and the doctors, but, can you be a little bit more, specific about sort of what some of the baseline assessments are that you do in terms of labs and other things. So, yeah, so I mean, the, the, the most important piece is to really start to define, you know, where that person's metabolism is at.

And so baseline for us is, you know, everything from, you know, a lot of people don't look deeply into a, a CMP and a CDC, for example, even looking at neutrophils, percent monocytes, percent eosinophilia and percent place of pills, which is on every CBC with a differential.

It tells you a tremendous amount about that inflammatory burden. That's taking place in that individual. I think we, we don't explain those things well enough.

I, I when I wrote my book, Your Blood Never Lies, it was to try to do that so the consumer can understand that. So, a CBC and a CMP is incredibly important, because for me, if I just look at the Kaiser Permanente study from, you know, 2006, for every point over 84 on a blood sugar represents a 6% risk of being a diabetic in the next decade.

Right? So you have people running around the 95 blood sugar with a 60% risk of being a person with diabetes. And there's a reason why people with diabetes die early.

Their inflammatory engines, you know, they they they make a ton of inflammatory compounds that damage their their kidneys, their arteries, their heart, their brain.

They end up with all the comorbidities that are the worst possible thing. So I'm big on early identification of glucose and insulin. I like when I have them, go and they test and give me their one hour and two hour postprandial glucose and at their home because it helps me to get them engaged in doing something when they're away from me.

And then they report it back. And I think that's important. I like advanced lipid markers. I mean, I really think it's important that we right away characterize OCS, LDL, and Bobby and Milo peroxidase and LPA, and look at lipid particle size, because if you're not looking at that, the real hallmark trait of metformin in one of the first hallmark traits is dyslipidemia, meaning you're making more inflammatory.

Right? It makes sense. Right. And syndrome early metabolic syndrome. Yeah. Yeah. And and so then the next trait which a lot of people don't look at is their iron and ferritin relationship.

Okay. Yeah I you know, ferritin is a as a marker for iron stores is there's great data on higher than 100. You start to increase your cardiovascular and cancer risk.

It's it's quite it's quite significant. I, I try to keep my patients between 1500. Right. And when it gets really low. So I go down into the 20s or teens.

What they have found is that people that are metabolically inflamed and what that means, if you're a practitioner, you're listening. Look, you have all kinds of things that trigger the inflammation process, right?

Yeah. Vectors. You've got metals, you've got bio toxins, stress, poor diet. You know we can over exercise just as bad is not enough. As so all these different things that we can check the box and go, all right, here's the things that trigger inflammation.

Trauma. But your body's supposed to turn it off. And when it doesn't have the requisite tools or capacity to turn it off, then these other things start to take place, like dyslipidemia.

But what happens is you start making hep C and and you down regulate ferro portant. And so you don't store hardly any ferritin, even though you got ideal iron.

You look at their iron story, you go, wow, it's good, your hemoglobin is good, but they've got very low iron or ferritin and they have a high mean platelet volume there and plenty of it.

That's that correlation. What what's the pathophysiology behind that all. It's interesting what they have found out that inflammatory cytokines, activity in the body at a low grade actually increases mean platelet volume.

And so we see there's a two fold process that takes place mean platelet volume gets. And I encourage people to look at mean platelet volumes. I'll tell you what.

It is crazy how well it correlates. So mean platelet volumes that are in the upper fourth quartile. We're out of range. Combined with low ferritin is a very high likelihood of metabolic inflammation that may not be expressing itself fully

yet, but it's there.

So maybe you have to start digging around a little bit more. Maybe I'm looking for metallic protein ACS like MP3 or MMP nine or I'm looking maybe for TGF beta one or or I'm looking at other avant garde.

But I'd say, you know, things that don't normally get run markers of inflammation, shifts in the immune system. And see it's important because if ferritin is low we don't get EPO production.

So what do we start to see? We see changes in red blood cells and platelets. We start to see in a low oxygen environment, you know the platelets start going up.

So you really got to start to look at because look in the end if we're not carrying oxygen we're in trouble. Right. So I'm incredibly interested in this relationship that takes place.

And and then the next piece that takes place is you get as it's pretty well established. I know I've been talking about this for years, but under chronic inflammation you shut down your ERS one and I arrest you signaling.

And when you shut down IRS one and IRS two, you're going to end up triggering, glute one transport of glucose into the cell, which means you're making two packets of ATP instead of 38 packets of ATP.

Once that occurs and you have a high lactate environment within the cell, you trigger hypoxia inducible factor one, which now starts to trigger that damage to the DNA in the mitochondria.

And we start to shorten our telomeres. We start to create more oxidative stress. And if we're lucky we induce p53 suicide genes. But typically the oncogene that after that that continued pressure to be acidic within the cell overwhelms the cell, allows for that immortality to take place.

And that is why when we wrote this book, you know, diabetes and cancer epidemiologic links to molecular evidence in that book, we wrote ten years ago, Karger Press, that was a medical textbook.

It's now out there the last five years. Oh, yeah. People with diabetes, four fold higher risk of GI cancers, higher risks of prostate, higher risks of urethral cancers, associations and women with breast cancer and insulin resistance and low thyroid function, which, by the way, by default you will have lower thyroid function when you're in that Warburg state because you can't you have any ox phosphorylation relationships that are going on.

So that's kind of, you know, some of the pathways I start to look at are how do I measure this? So we do a complete thyroid panel including reverse T3.

And of course look for antibodies both TPO and fiber globulin. Look at free and total T4 and T3. So the other thing I have a little bit of you know, I mean, how many times have you seen this doc.

Right. People give thyroid hormone and they go, they're going to love me because they're going to get energy. And you that you come back after 60 days, you draw their blood to see where they're at.

The other TSH may change, but their free fraction did not change that much. Almost nothing because they only gave T4.

Key Lab Markers for Metabolic Inflammation

Right. And and so and, and a lot of that has to do with the fact that if you're not sleeping well and you're. Yeah, you make a lot of thyroid binding globulin, and when you make thyroid binding globulin, you can give them all the thyroid hormone you want.

And it's going to bind it up and you're not going to get the benefit. So in addition to the fact that we do a complete lipid profile, we look at glucose and insulin.

We like to look at it, challenged as well. We like to look at CMP and CBC. We love to see both a serum morning cortisol and DHEA is because serum morning cortisol is do matter.

A lot of people poopoo them. But there's a ton of literature on morning serum cortisol. However, I like to get either a salivary or a urinary cortisol as well, just to see if they flatten their cortisol curve.

Because if you flatten your cortisol curve, there are hallmark studies showing that, you know, it's a leading causality for the development of metabolic syndrome, cancer, you know, diabetes and heart disease.

Right. So so I like to get that you're saying it's flat because you don't get the increase in the morning. That's the morning. Cortisol is telling you, you know, you like to probably see it above ten or maybe 15, but not too high.

And then if it's not high, that means they're overly stressed and, and it just flattens throughout the day. That's what. That's what you're looking for.

Just, for some numbers for our listeners. Yeah, yeah, I get morning cortisol is on patients as well. You don't have as much experience with the salivary panel.

But, I would imagine it gives you gives you even even more information. I want to ask you about C-reactive protein, which is sort of a more basic marker for and you see those same correlations between the MPV, and and C reactive, protein because that's sort of the integrated biophysics, you know, any other anti-TNF alpha, any other, you know, cytokines that, are produced by the senescence, associated secretory phenotype.

Yeah. Because, I mean, when oh, I check crp, I check homocysteine. You know, I when it's the right panel, I'll do, you know, the oxygen assay. And we looked at that job, you know, because, you know, VEGF is interesting in terms of, you know, chronic immune activation and low fat.

Jeff. And of course, the correlate to inflammation in tissues, for example, in the colon with high veg AF and the increased corresponding risk to colon cancers, with a high that just in people with colitis.

So I like to get VEGF, I like to get GT is a global kind of thought of, you know, hey, you know, what's that? And to feel your function looking like, and, and, and, you know, it's interesting function.

Did you say no? Yeah. GT actually gives you, it's another prognostic marker for oxidative stress in the endothelium. Oh, interesting. What I have seen and as part of art or software that, you know, even well below the upper end of the normal range, there's a graded, there's literature supporting a graded improvement in outcomes.

The lower you get, the lower your AST, the lower your Alt. You know, that's, you know what I call the sort of you're missing out on an opportunity if you're just looking at whether it's high or abnormal or high or low.

Right. You know about that relationship. But that's an that's an interesting one. But it makes sense. You know, the liver is is, you know, not happy and a little inflamed.

That's a marker, for inflammation throughout the rest of the body. And it's a systemic disorder for sure. Right. You know, I think you're probably familiar with, you know, age a Morgan Levine and and Dan Belsky, put out from the the neden, well, originally from the Danny and then also, cohort but then also from and Haines data etc.

and looking at, they were trying to train their DNA methylation on something that was more germane in chronological age. And they looked at these nine other markers, and they include all these ones in the CMP and the CVC that, you know, we didn't think meant anything.

In fact, it turns out that if you used large databases, you can predict mortality, you can predict chronological age. And, you know, it was a, you know, an I machine learning, sort of validation of what all these other studies were looking at.

And RTW is included in there as well, which is a fascinating marker. Well, of course, I mean, red cell with so important. And, you know, I think it's funny, I mean, even something like if you look at electrolytes, if you look at anion gap, yeah.

Two doses. Yeah. You look at acidosis with anion gap, you know, I mean there's there's studies out there that do all these correlations that I think are fascinating.

And of course that's why I think it's so interesting. For example, serum potassium is below 4 or 5 fourfold risk of diabetes in the next decade, right?

I mean, there's there's all these great correlations. And that's why I've been, you know, when we wrote the metabolic code algorithms, it's about, I don't know, approaching 40,000 decisions in the algorithm.

You know, it it was really meant to say, you know, it's not just about being high and low. It's about where you're going. Where are you trending high?

Are you trending low? Are you dialed in an optimum? Do you feel the best you can feel, and if not, where is that gold nuggets in your labs that are showing you that.

Now the other thing I think is important, and I know you've probably seen this as well. I've had people come in and they go, I feel terrible. You know, one doctor says, I got fibromyalgia.

Another one says, I got bio toxin illness. Another one says, I got Lyme, I got this, I got that. Yeah, I hear that labs or too much. Right, right. And and then he got subspecialties within A's management medicine or integrative medicine. I was just looking at one thing.

It's like a cardiologist, you know, it's interesting. Yeah. Go ahead. Yeah. So, I mean, sometimes you get people with a lot of complaints and their labs don't look that bad.

And sometimes you get people come in and they look great. They feel great. And you look at their labs and you go, hey, you know what? We got a lot of work to do.

And I think it's why it's important that we make sure we don't lose sight of, am I moving the needle? I want that person to feel better, you know? So, you know, for the way I've always taught, at least when I'm trying to work with docs, is get somebody to feel better right away, try to do something.

It's a win. Because if you can get them to feel a little bit better, they'll follow you anywhere. If you go by these principles. Oh, my God, I've got this organic acid urine and it says you need B vitamins and you need this and you need that, and you need this, and you give them a bottle, a box of 20 pills.

And it doesn't really target the fact that they came in because, hey, I'm gassy, I'm bloated, I'm anxious, I'm nervous. You're you got to pick something.

And and you know, I think it's, you know, we we forget that the real goal is get that person better quick. Yeah. I mean, I will definitely keep them around for sure.

And yeah, I agree with you. I mean, we get tend to get, sort of focused on the metrics which are absolutely important because they your other patient who felt, well, you know, is a time bomb because we saw the metrics were going in the wrong direction. So you want to do that.

But if you, you know, are giving them this, as you say, a box of patients company with boxes of pills, but they they're not feeling any better. Their symptoms.

We're in address. I mean that's not what they're coming to see you for. I mean you want to fix that and then say, okay, let's further arrange things so that five, ten years from now you're going to be functioning well and disease

free.

But addressing the symptoms is absolutely something that is sometimes missed when, you know, all these labs are sort of telling you that, well, you got to fix this. You got to fix that.

I mean, and also most of them are going to take 20, 20 pills a day. So you have to they can choose. Not very well, right. You have to you have to hierarchies and, you know, triage, which are the most important ones which, which the numbers do help you pick up, pick up as well.

So in terms of, telomere biology in your practice, are you, using, doing anything besides, obviously what I love about human biology is that, you know, many, many association studies and intervention studies show that all the bad things that we knew about before telomeres came onto the scene are associated with short telomeres.

All the good things can fix those problems and are associated with longer telomeres and telomere attrition. But, are you, are you using to 65, you're measuring telomeres.

You have a, any case cases or anything like that that I measure, I measure, telomeres. Now measuring glycans as well do true age. And, look, I think it's very clear that, now, the one thing I would say that skews my data is that, you know, I'm pretty heavy handed on getting people to try to improve their nutrition.

You know, I, I lean on, you know, it's like, now you can't keep eating pizza and chicken wings that, the wing sauce is not made out of high antioxidant compounds, although you may think that it's not.

So I do think that, it, you know, I excuse it a little bit, but, I mean, 65 has got it. What a great body of evidence. It's coming out about its effect.

Now in terms of the data, I mean, they're doing the studies that are showing that we're seeing these changes. And so I see that in individuals when they take to 65, I mean, yeah, telomeres lengthen.

But you know, more importantly than that, in general people start feeling better because you know, when you combine something that is in some way modulating inflammatory signaling in people are going to, start to feel a difference.

And so I, I like to say 65, I think it's a great compound. I think it's it's in my wheelhouse of my I, when I came out of my pharmacy school, I'm a big believer.

I think plant compounds are amazing. I think there's a lot of science and plant compounds. I think that there's a lot of false prophets out there in terms of question, no question.

You know, I mean, it's like, oh yeah, it's kind of like 65. No, we didn't do the research on it and it's not exactly extracted the same, but it came from the same parent plant.

So that makes it the same. And that's the part that, you know, I want to encourage, you know, health care providers that are listening, get the, the compounds that were studied so that you can have a chance at getting the results from the studies and then give it and the doses that were given in the studies, so that you can once again have the best chance at making a recommendation that works.

And I think to 65 is one of those hallmark examples of an elegant compound that was, you know, scientifically extracted and formulated for a specific target.

And, and, and, and then came through on that promise because they've got studies that support it. But I think we need more of that. There's some great ones out there that are that way.

But this is a great example of one of those, compounds that are so I think going to be valuable now that we're kind of all understanding this, you know, notion of longevity and healthspan and then it's real.

And then we can combine things like fasting, mimicry, or you know what? I, you know, time restricted eating and using the right nutrients and maybe, you know, not dousing ourself with gasoline, you know, and smelling it, you know, it's like all that kind of exposure stuff people end up doing when they're not.

I remember in chem lab, I used to play around with the time we oh, there you go. What's good? Maybe we didn't know any better. It's just kind of good.

You know, red wine for that kind of stuff for of sniffing, but, but, yeah, I'm sure that wasn't a good thing, at all. Yeah. I mean, as far as I mean, I think you're absolutely right.

The supplement industry, there are two things that they do. One is they, you know, they don't show the data, and then they also do things with regard to dose, like if you have a, a supplement with multiple compounds in it, and they'll put in a compound that, you know, sort of a marquee name like a Coke, you ten or an alpha lipoic acid or five milligrams it, which is homoeopathy for both of those compounds.

That's right. It's really, you know, unfortunate that they're trying to do that, with regard to like, five. We just started out as a drug and a biotech company.

It was, you know, a natural compound screen of 5000 natural compounds. And and they got hits for telomerase activation. They went through the preclinical safety studies in animals, and they started to clinical in, in disease states within the company shifted their focus.

So it's a fully vetted, sort of compound that happens, as you know, Dr.

Telomeres, Glycans, and Longevity Tools

Johnson and other things come from a natural product which which I think, you know, is, is a, generally a, an idea that's going to be safe has been used for a long time.

So, with nad it's the same thing. There's a, there's 180 products out there, but you know, there's a couple of companies that have done the studies have shown that their combat raises energy levels.

And that's, you know, you want to typically use those those kinds of companies because it's, as the old saying goes, you know, in God we trust for the rest, show me the data right.

That's exactly right. Yeah. And it brings up a good, you know, that, I mean, that whole concept of NB, I mean, I think this last year, I, there's one thing that came out of this last year and a half of, you know, tremendous suffering for a lot of people is this awareness of how our immune system works.

And, you know, a lot of people think of NAD as, oh, yeah, it makes energy. Well, yeah, it's when your energy levels are up inside your cell, you have the energy to trigger the enzyme processes that fight a viral insult.

And when your NAD level goes low in your in your called your, you know, p pa enzyme substrates do not have the fuel to be able to fight that viral spike in the in the cytokine an expression that goes on after.

Yeah. If your energy levels are low, guess what. You know that's going to that's going to be a problem. You're not going to be able to fight things off and you're going to have a cytokine storm like nobody's business.

And unfortunately, we see a lot of people in our culture, people that are overweight, people who are obese, people that are diabetic, pre-diabetic, a lot of populations of folks we know even with just aging, our energy levels go down, you know, you know, each decade.

Right. So so being able to supply that, you know, I know nicotinamide Riverside being the one that goes through the the, you know, the salvage pathway, to be able to directly get into the cell, you know, I think I think those are important concepts that, you know, we have to be able to explain that to individuals.

It's like, look, your immune system just isn't kind of out there. It it has needs. Just like your heart does, just like your kidneys do, just like your pancreas does.

You know, there's nutrients that can support the, you know, the proper response and the proper defense of your immune system. And, you know, I think we're finally getting that message across where people go, oh, I actually have to work on it.

Just like I have to work on my heart health or my, you know, my blood sugar health. Yeah. A lot of that is is reducing stress, both, emotional psychological and, and, and physical and, and, you know, there's, there's lots of studies where Olympic athletes or, you know, elite athletes that are training a lot are more susceptible to viral infections and common colds.

And, you know, for for our listeners and for the and for the for the doctors taking care of them during this pandemic. You don't want to be, you know, hitting it, doing hit training.

Five days a week. Like that's just that's going to make you more susceptible. You know, I'm sure Gordon's to I mean, I'm not I'm absolutely sure Gordon's showing the data. Gordon.

Less that you're like, glycan age is going to go up in these athletes that are overdoing it and not allowing time for recovery. Exercise is a stress. In order to get improvements, the hermetic effect needs a little time to rest and regenerate.

And if you don't leave that time, that's where things like heart rate variability, the work or the aura ring come in nicely in terms of telling you where you are.

And then the like in each test would tell you over a more 3 to 4 week time period how much you've been stressing yourself. If it's dropping, know if it's going up in age.

So it's it's I think it's been great that we have all these new tools that tell us that a systemic and a molecular level on a cellular level, you know, whether our our whether we're helping our patients in the right way and our patients are doing the right things.

And, you know, your metabolic code system is, is fantastic for doing that as well. Let's see, we've talked about a whole bunch of res what's, what's next for, for Jim about, well, I'm 60 is a new 40.

Right. So you still got lots of things to do. We're going to have to go and train today. I know that, but, and but not overtrain. One thing I've done is learned how to, train for my age.

And, I, you know, I think what's next is just this continued evolution of incorporating more data into our cloud based platform, so that we can continue to create this, you know, meta formation score and metadata typing score.

And really just, you know, I'm very passionate about here's the biggest criticism in our space, right? Yeah. And I mean, even in medicine, I criticize, I'm critical of even traditional medicine of it.

Because when people would say to me, you have no data, then I would say, well, give me data on any three drugs that I choose. The pick that you commonly prescribed all at the same time.

And. Right, exactly. Polypharmacy. It's a problem. It's a big problem. And so the whole reason I developed our, our platform was to say, what drugs are you on?

How are you eating? What are your symptoms? What nutrients were you given? What kind of stress are you under which biometrics look like? And then track did did you do the plan and what is the outcome of that?

And create a score system on what's called Bayesian modeling or accelerated modeling of the data that says, hey, you were like this, you're in a geometric progression towards, you know, cardiometabolic illness or whatever.

It is just aging. And now you're doing this. And the next time I see you, you're doing this, and I think it's important that we can start to actually show more of a and this is the NIH is term, not not mine.

This is the new term whole person health that we start to really look at and encapsulate everything about that person. And then what interventions took place and what worked.

And of course with AI, we'll start to really figure out what the nuggets were of what truly worked and was truly important for that person's metabolic distortions that took place within them.

So it's important for us to to track are we get into their behavior change? Are we getting to the lab changes? Are we getting to the symptom changes where what does their Woop say right now.

Yeah, I think you're you're absolutely right. I mean, the thing in in response to somebody who said, well, you don't have the data and they're talking about these large randomized controlled trials for, say something like Lipitor.

Well, you know, if you're not exactly her patients, not exactly like the average person in that trial, then this probably isn't, applicable to you, which we learned the painful lesson from the guy.

You know, all those older women being started on hormones. That's not the women that we're getting started on in our practices. So that data is not applicable to them.

You know, and then the whole concept of whole person, I was having a conversation with the, the CEO of a large up and coming health care company, and he said that I was talking to some other executives and they were talking about patient centric medicine, basic patient, what other kind of centric medicine is?

You know, it's like, well, the patient comfort, you know, it's payor centric was what it was before. Oh no, you didn't realize how ridiculous that concept is until you really start to see things the way you should be seeing all along.

And, you know, you have markers that we know the salutary direction of change in your mind of one patient that is, you know, you're doing all these manipulations because you're seeing the markers and you see what directions they have to go in.

And if their overall, you know, trajectory is, is in a de-aging or, you know, less metabolic and less inflammation, then you're doing better for your patient.

Then the guy that just says your cholesterol is 200 DB on snap, period. End of story. And so I totally agree with you on that. And I think thankfully the field is moving that way.

You know, Michael Schneider at Stanford doing all these biometrics on himself. And then when we put this all into a large database, we'll start to get these.

It's like you're starting to get these types, metabolite types because of ego types. And we'll be able to even more, with more evidence, sort of, tweak a person's program.

I wanted to get one, one, one questions that you are so focused on metabolism. And since this is such a big, area of of interest and controversy, what's your take on metformin as an anti-aging medication?

And should everybody be taking it? Well, I mean, it's just like a stat and everybody should take it right?

Metformin, Exercise, and Closing Thoughts

I, I get this question. I got this question just today from a patient. I got it from another patient of mine a while ago. I posted on Instagram about it.

I have my take. I'm curious about what yours is. Well, my take is, is that it may be applicable for some people, but

it's not going to be applicable for all.

I'm not surprised that you're taking exactly the same as mine, because on the same page with this. Yeah, yeah. I, you know, look, I think, you know, as drugs go, as you know, and because I, I'm a clinical pharmacist, you know, I'm an active, you know, clinical pharmacist.

You know, I, I'm not against drugs. I just know you you have to treat them with a lot of respect. And you gotta have your eyes wide open when people are taking them, because a lot of times, side effects are occurring six months a year, 18 months down the road.

And you're not attributing that to a drug because they didn't get a Stevens Johnson syndrome, or their tongue is not swollen or they didn't get a massive rash that we call an adverse event.

Instead, it's an adverse metabolic event that occurs over time. And and that many times is due to the lot of the research I wrote the the databases on drug induced nutrient depletion.

So wrote the drug induced nutrient depletion handbook. And really that stuff is real. People take drugs, it depletes nutrients. And when you lose nutrients, you change physiology in your body.

So with metformin there's the issue of it changing the microbiome in some people negatively, not positively. I find that to be an issue. The other thing is, is everybody just goes all take metformin.

You know, you got to read even even the American Society of Endocrinology says you got to check methyl acid every six months because metformin by its depletion of B12, will cause an elevated metabolic acid and induce neuropathy at some point.

And a subpopulation of people. And so I, I always worry about when we start to talk about giving out drugs as if they're nutrients, because they're not they they need to be monitored.

Rapamycin, you know. Oh, yeah. Well, that's why I just dropped the bomb, right? I mean, you know, so, you know, I just I just have this notion and once again, I'm like, I love being a pharmacist.

I love spinning molecules. I love I, I just am as passionate about it is the first day I built my first 3D model of a receptor, right? I, I dig it, but the issue is we have to be very careful about, you know, you know, what we're going to do with drugs.

Not now is, you know, is, ram a pro, a great drug for a diabetic because it's going to spare their kidneys and reduce their, their their stroke risk. Yeah. Okay.

Dave is there for that. Yeah. Yeah. They're already but they're already there with the disease. Right. You know, so when we start with a drug to prevent diseases, I, I start to kind of go, wait a second.

Not not so sure. You know, the bar goes higher. You know, I'm really glad I asked that question because my reason for having the same answer that you gave initially for many people, but maybe not for everybody, was not exactly that, but I think that's a very valid reason.

My reason was that the reason for prescribing it for everybody is because of a large data base that shows that it, you know, in older patients, seems to reduce their risk of death and multiple multiple diseases.

But those people are not the kinds of patients that I see typically are a lot of people that are asking me about whether I should be on metformin. These people are metabolically fit.

They've got no insulin resistance. You know, they're exercising regularly. There's a good body of data to show that it with both resistance exercise and aerobic exercise, it blunts the response.

So you know, that's a that's an adverse effect that you're not going to pick up unless you're somebody that's putting the work in. So I absolutely tell patients and you know, even Peter Attia I think has changed his tune on this, you know, he does a lot of he was advocating for, you know, of course, near Basel.

I haven't changed his tune on it yet, but, right. But his but in the, his population older, relatively sedate. You know. Yeah. They're sedentary, they're individuals.

It probably will have a beneficial effect. Is that applicable to our healthy metabolically fit activity exercising patients? I don't think so. Plus it's it isn't mitochondrial toxin.

So you know, that's how it works. There's that. Yeah. Yeah. So yeah I think yeah. Great points I mean I, I you know I it's interesting, you know first of all we got this huge population of people that are insulin resistant.

So of course if you give a sedentary person something that's going to help their insulin receptor, you know, Act acts a little bit of an insulin mimetic and get things moving.

Well, heck yeah, you you're going to reduce their mortality because elevated blood sugar is one of the most damaging things to every cell in your body.

I mean, okay, but does that mean, you know, for me, I mean, much like you, I mean, I strength training, I do resistance training and I do aerobics training, and I, and I and, I think they're both important and, and I think it's one of the reasons I've stayed healthy and, you know, and, and I advocate that to my patients that, you know, hey, look, you need to move, you have to move, and you have to, you know, and you have to stay flexible because muscle is the currency of aging, right?

You keep your lean mass, you will age better. You will bend over better. Your three dimensional coherence of your next step you take when you're 78 years old.

When that one person falls, you may not, because your neuromuscular junctions are more fit and more firing because you've taken care of yourself. And, at the same time, when we're doing those things, these interventions aren't targeted for us.

I mean, I, I could not agree with you more. Yeah. I mean, I think you make a great point about exercise, and I'm getting to the point where obviously both are very important, but I'm getting to the point where in older patients, if you had to choose one, it's going to be resistance training.

Absolutely. You know, that's because you're going to get some cardio with that, but also because maintaining muscle mass, preventing sarcopenia and even short of sarcopenia, just all of the benefits of having we know it's an it's like it's an endocrine organ at this point.

Just like, you know, the fat level. So yeah, the fascinating conversation, Jim. We could go on, I think for, for a long time, but I think we've been going about an hour.

So, so, you know, you're doing great work. Really happy to have this conversation. Look forward to seeing what's next for you and, and, and, probably can see it for him coming down the line.

Yes, you will. We'll be there hammering away. So, thanks for having me on. It was it was a pleasure. As those a bunch of fun. Get to chat with you. You're welcome.