

HealthSpan Explained: The Future of Aging | Ep. 1 of 6 Transcript

[00:00:00]

Healthy Aging Series Intro

Shruti Naik: Hi, welcome back to The Vitals, the Mount Sinai Health System's video podcast. I'm Shruti Naik, a scientist at the Icahn School of Medicine at Mount Sinai, and your guest host for the first episode in a new series on healthy aging. Aging is everywhere right now, and there's no shortage of supplements, protocols, and clinics promising dramatic results.

This series is different. We're talking to physicians and scientists advancing what medicine can actually do, grounded in evidence and emerging clinical tools. Today we start with the basics. What's aging biologically? What do these buzzwords really mean, and what can truly be changed? Joining me are the experts Dr.

Miriam Merad, Zahi Fayad, and longevity physician Fiorina Kyritsi, to connect aging biology to heart disease and cancer, translate prevention into real life, and share how Mount Sinai is turning longevity science into smarter screening and care. If you'd like to learn more about our lifespan clinical trial, scan the QR code on your screen or click the link in the description. [00:01:00]

Panelists, welcome. Let's get into it.

Defining Healthy Aging

Shruti Naik: I wanna start really from the bottom, right? We hear this word aging thrown around for a very long time. I think, uh, man has been in search of immortality since antiquity. Mm. Cleopatra, all of the kings of all- Mm ... everyone wants to live forever. Um, but I feel that science is now catching up to that, that chase, and I wanna hear from you, you know, how do you think about aging?

How do you define aging? What is aging to you, the experts? So our longevity physician, maybe you can kick it off.

Fiorina Kyritsi: So then I'll focus on healthy aging, how I think of healthy aging. To me, healthy aging means preservation of function across multiple domains, both physically, cognitively, uh, also metabolically.

And how that looks into everyday life is someone being able [00:02:00] to walk on a normal, uh, speed without be- getting winded.

Shruti Naik: Mm.

Fiorina Kyritsi: Being able to climb stairs without having to hold on the railing, can carry their groceries, also can think and make decisions for themselves, be able to take medications, and also pay bills.

Uh, so I think that healthy aging has to do with being able to maintain mobility, also cognitive function, emotional wellbeing, and independence. And today we do have good ways to measure how someone does in terms of that and how we can preserve it for as long as possible.

Shruti Naik: So what you're saying sounds a little bit different than what Cleopatra was chasing, which is immortality- Mm

which is living forever. M- could you explain a little bit more about how that's different? And, and, you know, feel free to chime in-

Fiorina Kyritsi: You mean more of the idea of what is-

Lifespan vs Healthspan

Shruti Naik: What is, what is... You know, I hear the word lifespan and healthspan thrown around a lot. Yeah. Right? [00:03:00] So lifespan is the immortality- That's all

uh, chasing living forever, but- If

Fiorina Kyritsi: we were to break it down, lifespan is how many y- how many years someone lives, the years between birth and death. And definitely within the past century, we have made great advances into extending someone's lifespan. We treat infections much better. We have improved cancer survival.

We can... We have improved cardiovascular- Mm-hmm ... uh, health. Healthspan, on the other hand, means mostly how l- long someone lives well.

Shruti Naik: Mm.

Fiorina Kyritsi: And that means being free of chronic disease and functional decline, and maintain, uh, himself cognitively. It's about, as I said before, cognition, mobility, independence, emotional wellbeing.

And here-

Miriam Merad: Age better. Age better- Better, yeah ... instead of, of live forever, right?

Fiorina Kyritsi: Absolutely.

Miriam Merad: Like the main difference

Fiorina Kyritsi: is that- And I think this is where we have found the disconnect- Yeah ... that nowadays ma- uh, living longer doesn't mean necessarily that you live better. Yeah. Yeah. You have all [00:04:00] these people- That's right

that they spend at least 10 or 15 years- Yeah ... of their lives- Exactly ... in the end that they're battling chronic disease- Oh ... and disability.

Shruti Naik: Yeah.

Fiorina Kyritsi: Yeah. And there's no quality of life, let alone also the implications for the healthcare systems that have to take care of them.

Zahi Fayad: Yeah, I mean, we're trying to close that gap-

Fiorina Kyritsi: Mm.

Mm ...

Zahi Fayad: uh, between that lifespan and then that healthspan. And I think people, you know, I mean, a- as you said, I mean, if you look at history, yes, the, the aspect of, of immortality and be living forever or this elixir of life, I mean- Right ... I, I, I think now, you know, p- people have, you know, gotten over that.

Although there are plenty, plenty of people, especially on the West Coast, who are, you know, spending money on advocating, you know, for aspect of, you know, living to be 120. They really feel-

Shruti Naik: Mm ...

Zahi Fayad: that this is something achievable. But I think let's, you know, step back a little bit, and I... If we make progress in- shortening that gap or, or closing that gap between health span and lifespan, we would've done incredibly well.

That could be our phase one. Maybe phase two, you know, 50 years from [00:05:00] now, et cetera, we could be going after this 120. And then phase three, live forever. Let's figure it out.

Shruti Naik: Well,

Zahi Fayad: so let's live- And that, that's not what we wanna do right now ... healthy forever.

Miriam Merad: Let's live healthy

Shruti Naik: forever,

Miriam Merad: right?

Measuring Aging and Health

Miriam Merad: But I want to go back to what aging means.

But for me, as a, as a cellu- as an immunologist, aging, uh, is, is changes, like cellular and molecular changes that you can quantify, you can measure, and, uh, and, and, and potentially modulate, right? And, and something I think we still need to do, and I think this is what we are trying to do together, is really measure, uh, what happens, you know, at, at really the, the, the molecular level, and then correlate this with outcome.

And then say, "Well, you know, potentially I can modulate this outcome because now I know what changes we are going to, and potentially correlate those changes with poor outcome or with better outcome." When you do that, I think you have this rational way of approaching aging, hopefully.

Fiorina Kyritsi: Monitor trajectories.

Shruti Naik: Well, [00:06:00] so, you know, from what you said, which is we understood disease, we understood the biological process of disease, and that made our lifespan longer. And you guys, what you wanna do is understand the biological process of aging and make your health span longer. So tell me a little bit more about what that biological process is, and how you're thinking about measuring it.

What are the things that you can measure to understand what the process is, or do we already know? Is this already- Yeah.

Zahi Fayad: Mm-hmm ... you

Shruti Naik: know, solved or on its way to being solved?

Zahi Fayad: May- maybe I wanna correct one more thing. I think we're interested in health.

Shruti Naik: Okay.

Zahi Fayad: I mean, it's not a question that we, you know, we wanna figure out the aging.

I think we really wanna understand what are the trajectories of healthy aging.

Shruti Naik: So do we not know

Zahi Fayad: what health

Shruti Naik: is?

Zahi Fayad: We don't know. No, we don't know. I mean, this is probably the only industry that does not understand its gold standard.

Shruti Naik: That's crazy. Yes. We

Zahi Fayad: understand disease really well. We, we do fantastic, I think.

Miriam Merad: Yeah.

Zahi Fayad: You know, Mount Sinai is incredible, right? Yeah. Curing people, doing things. But we, we have not [00:07:00] spent enough time or have had anything to think what is that normal aging looks like.

Miriam Merad: Yeah.

Shruti Naik: Hmm.

Zahi Fayad: We lack, we lack that aspect.

Shruti Naik: So what do we need to understand health, then?

Zahi Fayad: You, you need biomarkers. You need to see things.

You need to measure things. You need to-

Miriam Merad: Right ...

Zahi Fayad: understand it biologically.

Miriam Merad: Yeah. And, and I think this is where Zahi and I are, are really our expertise comes together very well. We, we spend time measuring changes in your body, you know, this biology. Hmm. Uh, and Zahi wants to measure at a higher level using imaging, using sensors, and you talk about these.

You know, uh, you, so changes at, at the macro level or which, uh, measure changes at the, the micro- The

Shruti Naik: cellular level ...

Miriam Merad: and then try to correlate, uh, both. First, we will correlate, you know, these changes, and then we'll, with trajectory. And hopefully we'll understand what healthy aging means. You know, at some point, we know, we all feel it, unfortunately, that we are changing, you [00:08:00] know, metabolically.

So there's things that are changing on us. Is it, is it, is, does it mean that I'm going to be sick, or is it normal part of aging? Hmm. And how can I really, you know, move my trajectory in the, in the one that we all hope for, which is, you know, aging is still part of our process of living longer, but it doesn't mean that it would be associated with diseases.

So I think these are the all the trajectory that we are trying to dissect with all the expertise, technology, with the technology that we have here, and, uh- Yeah ... maybe you can add on, on your micro-

Zahi Fayad: Yeah ... macro level of measurement. Yeah. I mean, I, I honestly got into this because, you know, 20-plus years ago, you know, I've been focused on the study of cardiovascular disease.

Miriam Merad: Hmm.

Zahi Fayad: And one of the main focus, and this is here with Valentin Fuster who's really a cardiologist.

Shruti Naik: Yeah.

Zahi Fayad: And then he came... He, he started to study the plaque from a pathology point of view. This is atherosclerotic plaque. Hmm. And

Shruti Naik: then- So

Zahi Fayad: this is

Shruti Naik: what's clogging

Zahi Fayad: your arteries. What, what clogging or what is building [00:09:00] up- Oh, wow, okay

within your artery as bad actors.

Shruti Naik: Yeah.

Zahi Fayad: And then he wanted to move to, from the pathology to in vivo, uh, and then we, we started to look at it from an imaging point of view. So we, I started to think about pre-clinical disease, which mean disease before you even have a symptom- Mm ... or you feel it in your chest, or you get something, you know, in your brain And, and, and how we did this is with imaging.

So I started to actually study, in a sense, the aging of the vessel-

Shruti Naik: Mm ...

Zahi Fayad: you know, 20 plus nine years ago. And that was my focus, was really the aspect of pre-symptomatic disease, et cetera. Mm-hmm. And then little by little, because I started to get interested myself into, into lifestyle behaviors, so exercise, diet, and this, and this is actually why it converged for me.

Shruti Naik: Mm-hmm.

Zahi Fayad: So you're talking about what is aging and this. For me, it's what I want is vitality, you know? Mm. I obviously want to be vital throughout all these years.

Shruti Naik: Yeah.

Zahi Fayad: And that means a lot. Well, you look

Shruti Naik: great. What are you, what are you- ... working? It works, Zahi. Yeah. [00:10:00] Zahi. Like, I want to know. Tell us what you're doing.

Zahi Fayad: It's hard work. Well- It, it comes with a lot of hard work. So again, I, I, you know, trying to build from the science to the personal interest.

Miriam Merad: Yeah. I, I like this very much- Yeah, yeah ... this. You know, I'll tell you how I got into aging, because it just shows you how science is good. I got into aging during COVID when I realized that patients that were really at risk, I mean, the number one risk factor by far was age.

Fiorina Kyritsi: Mm.

Miriam Merad: And, and that got me, you know, really to think of... And then I was associating this with extraordinary inflammatory response. So we knew that a lot of inflammation with, was a cause of death, and that age was the number one risk factor for death. And then we decided with my lab, I remember saying, "Okay, we need to study-

Zahi Fayad: Mm

Miriam Merad: age, inflammation, and risk for disease," critical, viral illnesses, but beyond that. You know, so it's interesting how we came from our science and what we know- Yeah, yeah, absolutely ... through that question of aging, different reason, but bringing our expertise- Yeah, yeah ... I think, to the field. [00:11:00]

Zahi Fayad: I think- And it's fantastic also to be able to bring your personal thing into it.

Miriam Merad: Yeah. Yeah.

Zahi Fayad: And it's, uh, probably one of the only fields really that in a sense your cross, your professional and your personal are really combining together.

Shruti Naik: Yeah. Yeah. And your passion- Yeah, yeah, yeah ... is driving the discovery, right?

Fiorina Kyritsi: Yeah. Passion for patient care. And for me as a clinician-

Zahi Fayad: Yeah

Fiorina Kyritsi: Yes ... I just, you know, we want to focus on what we know already works and we have data on, and then definitely explore and collaborate with scientists like Zahi and Miriam- Yeah

to see what is emerging, what is next, and how we can incorporate it-

Shruti Naik: Yeah ...

Fiorina Kyritsi: to our clinical practice. So I think that's, uh, very fascinating.

Hype vs Evidence in Longevity

Shruti Naik: So, you know, I'm glad you brought up data- Yeah ... because here on the podcast, we like to promote evidence-based recommendations. And I, I'm gonna admit something. I am the most influenced scientist on the planet.

I'm on TikTok, and I try all the things, and then I find out that most of those promises are, are maybe overpromises. But, you know- They're

Zahi Fayad: emptying your bank account.

Shruti Naik: Yeah, I am emptying my bank account. Sinai, I need a [00:12:00] raise. Um, you know, so I want to talk a little bit about this. Yeah. Because there's so much out there in the media, on social media about all of these strategies for, you know, you can reverse your age with NAD+ or this supplement or that supplement.

I, I wanna talk a little bit about, you know, how you know things work. What's the promise? How do you, you know, how do I as a consumer differ between the hype, really, really well-produced, uh, you know, TikToks, and evidence-based, you know, this is what we know works? Is that, is that information even out there?

Zahi Fayad: Okay. I mean, that goes a little bit into the bro science also. I mean, this is not a new thing.

Shruti Naik: Bro

Zahi Fayad: science. Pe- people have been doing the bro science- ... for a very, very long time. It is true. I mean, seriously, in the gym. I mean, the aspect of exercise, and the supplement, and the steroid use, et cetera, all this is really bro [00:13:00] science.

Unfortunately- You

Miriam Merad: mean guy science?

Zahi Fayad: Yeah Yeah. That's what I thought. These are, these are bros- Like

Miriam Merad: woman who are doing

Zahi Fayad: things ... no, that, women too. I mean, but, but, but it's... what's- What's sister

Shruti Naik: science? Sister sci- The sister science is there too. Yeah. It's like, it's like celebrities taking those NAD- Yeah

drips, you know? Yeah. And, and- But- ... juice cleanses ... sure So that's the sister

Zahi Fayad: science. So, but, but seriously, surely the aspect is two. Number one, number one, I mean, of course, they, they are, you know, trying to sell something. You- Yeah ... let's not forget this. But fine, we're all suckers. We, we all fall in on, on, under this.

But the question is, what are, are you willing... what kind of risk are you willing to take?

Shruti Naik: Mm.

Zahi Fayad: Like about... So, so in a sense, you should look at it always from a risk point of view.

Shruti Naik: Mm.

Zahi Fayad: And then number two is, as you said, how do we know it's working? Then we go back to the science. I mean, then measure. You know, take a baseline of whatever it is that you're trying to induce into yourself, and then say, "Okay, did it really change, you know-

Fiorina Kyritsi: Mm

Zahi Fayad: the numbers?" If, if this is something that you can measure in, in, in a lab test or something. But I- [00:14:00] definitely do not go into these crazy stuff. Uh, and as, as I said, you'll be wasting your money, but also you'll be putting yourself at danger. So there's a gradation of what- Mm ... we as consumers should be adopting or

Fiorina Kyritsi: not.

I- Yeah ... think sometimes you just need to ask your patients when they come with- ... stacks of supplements and IVs just to draw a line and maybe sit down, be open, because maybe there is some supportive role to many of those- Mm ... and they have better data. But the question is, which one of those have some good human outcome data versus just a mechanistical plausibility?

Shruti Naik: Mm.

Fiorina Kyritsi: How they could help.

Shruti Naik: Mm-hmm.

Fiorina Kyritsi: So this is where I think it becomes a little bit of a deeper- And what's the risk profile, right? ... discussion. And it- what's the risk profile? And also, what do you absorb when you take 50- Yeah ... capsules at the same time? Yeah. Yeah. Exactly. Wow.

Shruti Naik: 50?

Fiorina Kyritsi: Oh, yes. I, uh, yes, I received a video- Not bad

the other day- Yeah, maybe send it to me ... showing my caps, what they take in the morning, the afternoon, and at night. Yeah. And I said, "You- Wow ... we will never absorb your antibiotics like this."

Shruti Naik: Wow.

Fiorina Kyritsi: Yeah.

Miriam Merad: So I can tell you how we approach our, [00:15:00] uh, the approach to all of these. We reversed it, right? So we are measuring all the, uh, s- immune...

So I, I'm an immunologist, so I study the inflammation, which- Mm-hmm ... we n- now I think all accept that is strongly associated with age and potentially a big driver- Right ... of age-associated disease. So instead of, um- you're trying, you know, all these perturbation on the immune system, what we decided to do is take different targeting, so human and animal, so, uh, two species that are not so related, and then measure changes in the old immune system and compare changes.

So you'll, you'll measure old versus young and then look at changes. And when you look at these changes, you say, "Okay, what is-

Shruti Naik: Mm ...

Miriam Merad: driving those changes? Is it a lack of some supplement?" Right? And we look at this- Yeah ... 'cause now, you know, with computational, uh, algorithm, with AI, you can really make, you know, uh, uh, you know, bring, like, formulate [00:16:00] hypothesis of what, of, of the driver of those changes.

Mm. And, and then we then supplement both animal and potentially- Sure ... patients, and then look whether you've restored these changes. Sure. And this is a nice way of progressing into this field is first start by deeply measuring with some granularity all the changes- Sure ... and then go and test whether you can reverse them, right?

And one by one. And I think at some point, if we do this seriously across many centers with other experts, we will have a recipe that hopefully will bring us in the right trajectory.

Fiorina Kyritsi: And the truth is that a lot of supplements have very strong, you know, clinical trial data- Mm ... or like vitamin D, omega3 fatty acids, but they're a little bit more disease or condition specific.

They have never been- Exactly ... looked into a lifespan- That's right ... longitudinal way. So maybe they have a supportive role to play and

Shruti Naik: be incorporated. I feel like we're... Yeah, I feel like we're transported back to, like, ninth grade biology- Yeah ... where we learned the scientific [00:17:00] method. Yeah. Right? Yeah. It's observe- Yeah

hypothesize- Yeah ... test-

Miriam Merad: Yes ... conclude. It's not so different from any other type of disease. Right. I think Zahid was saying we don't know the gold standard. This is like we jumped into age- Yeah ... associated disease instead of first touching what is aging, and then we jump too fast. Yeah. Right? And now I think we are saying, "Let's go back a little."

Mm. Mm-hmm. "Let's measure very carefully and then progress slowly together with our clinical partners."

Zahi Fayad: Yeah. I, I like what Miriam said on the aspect of using computational methodology and testings 'cause right now we, we do have, you know, un- under our, our, you know, use, we could do simulation, in silico simulation to try to say, "If I use this, you know, I sh- I test my microbiome."

We're actually working with a company that has, you know... And, uh, we can test the microbiome, check what you have, look at the literature and say, "Oh yeah, you know, you have this, you use this supplement or not." You could also do simulations in silico because [00:18:00] you have data on people, and you're able to optimize this.

So, so we need the evidence- Uh, and we're going to also get more and more 1- as we do more experimenting, these are N of 1 kinda experiment- Yeah ... or we are testing things on a longitudinal and trajectory basis. We have the chance as we collect more and more data to do this simulation and then to test them.

Shruti Naik: Mm.

Zahi Fayad: Yeah.

Shruti Naik: So I wanna get to how you're testing- Yeah ... and the very exciting x- Mm-hmm ... prize trial.

Zahi Fayad: Mm-hmm.

Shruti Naik: I wanna hear about the trial because it sounds like it's one of the first times we're measuring health and we're measuring aging. So tell me about what xprize is and, and what, you know, what's, what's the idea behind this trial?

Miriam Merad: Yeah. So it's not, it's not the first time, eh, that we are measure engaging 'cause m- many of our colleagues are doing it. But I think we are, uh, yes, we are trying to lead this, this big endeavor, which goal is to [00:19:00] measure, measure in a group of individual that, um, you know, that are over, did you say 60 or 65?

So- 65. 65. So we will be measuring changes and then introducing several intervention to see we c- whether we can reverse as with three big s- physiological system that we know age, which will include with the immune system, cognitive system, and then, uh- Muscle ... muscle function.

Shruti Naik: Okay. The brain,

Miriam Merad: immune- The brain, the immune, and the muscle, right?

All right. So we know that we lose muscle and we are, we become more frail with age. We know that our immune system decline and we become more susceptible to infection. And we know, unfortunately, that our cognition decline with age. And so we are trying to, uh, explore whether we can reverse, uh, uh, we can, whether, uh, improve, you know, these three system.

And we have collectively with several colleagues of ours, decided that inflammation that builds with age was a big driver of cognitive decline, [00:20:00] immune decline, and muscle loss. So we a- are n- uh, and so we thought about ways of, of reducing that inflammation and, um, and we, for the first time, I would say, will combine a series of intervention that would include exercise, an mTOR inhibitor, and then, uh, an antiviral drugs- Mm-hmm

that reduce the expression of, re-expression of ancient viruses that, uh, are very common when with age. In fact- Oh, wow. Yeah.

Fiorina Kyritsi: Mm-hmm.

Miriam Merad: It's a bit scary, I know. I don't want to scare- Mm ... uh, people here, but when we, you know, a, a, a large portion of our genome is made by d- of, of these ancient viruses that have integrated but don't, are not really expressed when you are young.

When you are a bit older, your genome is not as, uh, uh, protected. You know, it becomes a little bit loose, and we start re-expressing things that we've incorporated, you [00:21:00] know, during evolution, if we're allowed to talk about evolution on this podcast.

Shruti Naik: Yes, of course.

Miriam Merad: Are we? Okay.

Shruti Naik: Yeah, we're scientists.

Miriam Merad: So, and,

Shruti Naik: uh- We believe in evolution.

Miriam Merad: Ah, okay.

Shruti Naik: The evidence supports it.

Miriam Merad: All right. It's good because it's helpful.

Shruti Naik: The Earth is not flat. The Earth is not flat. Yeah. Not on this podcast at least.

Miriam Merad: Right. It's helpful. It helps, you know, discover novel therapy if you, you know, if you integrate all your understanding of evolution. So we know that this re-expression of viruses contribute to the sustained inflammation that we have with age.

Oh. And we have ways of really blocking this, in fact- Mm-hmm ... with drugs that have proven safe. So we will combine all of these- And

Zahi Fayad: spermidine

Miriam Merad: Ah, I forgot about- Yeah, it's something ... another very important supplement called spermidine, which has been shown to also prolong

longevity of many species. Uh, so we know that if you can prolong longevity of species that are, you know, very far apart, like m- uh, evolutionary, then probably-

Fiorina Kyritsi: Yeah

Miriam Merad: you are touching something that is important. You conserve only function that are essential. Mm. [00:22:00] Mm. So between the spermidine, this antiviral drug, mTOR inhibitor, and exercise, we hope that we will be able to reverse, uh, you know, this big inflammatory driver and improve all this system that I described.

Zahi Fayad: Yeah, and now, now spermidine, uh, g- is gonna go up in Amazon, uh-

Shruti Naik: Yeah, exactly.

Zahi Fayad: So, so let's be careful that this is not the spermidine that you're going to buy, uh, from Amazon. It's formulated in a different manner. Yeah.

Shruti Naik: So this is, like, therapeutically formulated-

Miriam Merad: Yeah ...

Shruti Naik: spermidine.

Zahi Fayad: Yeah. With bi- with the right bioavailability.

Let's

Shruti Naik: be- I see ...

Zahi Fayad: let,

Shruti Naik: maybe

Miriam Merad: you want to comment on this? Yeah. Yeah, so, so we realized that the spermidine that, uh, is being purchased by, um, you know, many individual on Amazon is probably not given the right formulation. So we have worked with, uh, um, a small company to d- to build the spermidine in the formulation where we are observing effect- Mm

you know, in, in animals. And, and, um, and we think that that will be a better formulation to lead to change.

Zahi Fayad: Yeah.

Miriam Merad: Maybe you can look, you [00:23:00] can talk about how we are

Zahi Fayad: measuring- Yeah ... these changes. I mean, so, so I mean, the nice thing about this trial, and I think, you know, we all, when we heard about it, there was a lot of hesitation because unless you define the biomarkers- Yeah

to hit this, then it's not going to lead to anywhere, and you're not gonna do 100 or 50 years study. So let me take a step back. Yeah, yeah.

Shruti Naik: This word biomarker gets thrown around a lot.

Zahi Fayad: Yes.

Shruti Naik: Right? What is it? Yeah. What is a biomarker?

Zahi Fayad: Yeah. So biomarker is something you measure to try to see if, is it going to represent the right effect of something that you're going to do.

Shruti Naik: But it's a thing- Yeah ... like a protein,

Zahi Fayad: a- So it could be, it could be a, a, blood ... molecule? Blood is a biomarker. Checking your, your LDL, your, your cholesterol level.

Shruti Naik: Mm. Oh, I see.

Zahi Fayad: It is a biomarker, so that's one of the biomarkers. It's accepted by the FDA.

Shruti Naik: Okay.

Zahi Fayad: When you do clinical trials and trying to demonstrate that you have a drug that's going to improve your cholesterol and improve your, your cardiovascular health, mortality, and morbidity.

So that's a biomarker. A biomarker could be something, again, that, let's say you measure with a sensor. [00:24:00]

Shruti Naik: Mm.

Wearables as Biomarkers

Zahi Fayad: Uh, let's say the wearables. I have one too, you know, here. But you know, you can measure your resting heart rate is a biomarker.

Shruti Naik: Mm.

Zahi Fayad: Your heart rate variability is another biomarker being measured by these sensors.

Temperature is a biomarker. Mm. So this is what we call biomarker. So we had hesitation. Why would you jump into a study? Yeah.

Healthspan Trial Blueprint

Zahi Fayad: Uh, you're not gonna do a 50-year study unless you, you know, have biomarkers that will tell you early on that, yes, there is a positive signal. So I, I would give them a lot of credit to the, to the, to the XPRIZE, uh, Healthspan, um, judges and, and initi- they really put together a blueprint that you need to hit these Biomarkers, you know, as, as Miriam said, related to your immune system, related to your cognitive, uh, system, and then to your muscle function.

Mm. So for muscle function, it's very c- very good because it goes into what I'm interested in, is they actually define that you need body composition. You need to measure what is the content of your muscle, uh, after a th- therapy, and then [00:25:00] imaging. You know, whole body MRI. Uh, not for screening of cancer here, not Pronovo and the other out- outlet that are out there.

This is really quantitative imaging Uh, so you can measure in vivo without radiation, uh, quantitatively, uh, non-invasively that. So that's actually, you know, very happy that they were able, uh, to adopt this. Uh, we also have measures related to cognitive function, and I know you'll be speaking with Dr. Fanni Elahi later on- That's right

and she will be telling you more about that, and obviously the immune health, uh, that you measure in your blood.

Shruti Naik: Yeah. So these are surrogates.

Zahi Fayad: Surrogates. '

Shruti Naik: Cause like you said, you can't-

Zahi Fayad: Biomarker are surrogates.

Shruti Naik: You can't wait around and see- Yeah ... if someone's- Exactly ... gonna live longer or age- Exactly

healthier, but these are surrogates that- Yeah ... we know based on scientific evidence- Yeah ... that indicate- Yeah ... this person- Yeah ... will have a- Yeah ... healthier outcome.

Zahi Fayad: Exactly. Yeah.

Iterating Interventions Fast

Miriam Merad: We are bringing them back to the right trajectory. Yeah. Because we would have- Yes ... measured prior to intervention- Yeah ... and then we are going to see whether our intervention- Monitoring

is bringing... [00:26:00] And if not, then we will, you know, with... Because there, there would be lot of computational algorithm perform on these patients, then we'll see, okay, so maybe this is not... But we are seeing d- we, we are still seeing a movement, and then we will do another study-

Fiorina Kyritsi: Mm ...

Miriam Merad: to add, you know, potentially another compound or, or add more lifestyle- Mm-hmm

uh, right, uh- Lifestyle ... changes. Yeah. And this is how we will progress. So for us, this is just the beginning. Yeah. We are hoping to collaborate with Shareena for many years to come.

Shruti Naik: Yeah.

Miriam Merad: And, uh, where we will together, uh, really define, you know, intervention that we hope will improve patients' health span.

Fiorina Kyritsi: And this is also my selling point. I tell my patients that you don't only get access to credible evidence-based- Mm ... longitudinal care with us, but also you have access to cutting-edge research and protocols and, uh, trials like XPRIZE. I will omit though that dead old viruses component. I don't wanna scare-

people out. Yeah. You can [00:27:00] do all the, the analysis there. But I think people are really willing and eager to see how we can monitor and-

Shruti Naik: Yeah ...

Fiorina Kyritsi: come up with immuno- immunological profiles or- Yeah ... inflammation profiles- Yeah ... and how that affects function.

Shruti Naik: How do you, how do you see this affecting your clinical practice in 10 years or five years?

Like what, what... Where do you see the real-world impact of these kind of trials?

Fiorina Kyritsi: I would love not to have to just talk to my patients theoretically and- Mm ... offer them mechanisms. The same way I consult and I advise them on how their blood pressure, giving them numbers, giving them ranges, makes a real difference because we have studied this on their overall cardiovascular health and cognitive health.

Yeah. How their LDL or the ApoB also helps with not building plaque so quickly. Mm. I would like those immune profiles and, uh- Yeah ... inflammatory markers or composites to be able to allow me to give them a story and also a way and [00:28:00] a path on how we can get there so as to maintain within range.

Shruti Naik: Wow. Okay, I have a very serious question.

Where can I sign up? Do you need a

Miriam Merad: control group? Well, you are too young, my dear. You are too young. But you need

Shruti Naik: a young control

Miriam Merad: group. It is true. You... yeah, no. And we want to start earlier and earlier. Uh, I mean, that's- But, but, but

Digital Twin Study

Zahi Fayad: Cherie, we have other studies also here- Yeah ... at Mount Sinai. I mean, we, we have a study that is observational, that looks at people's health trajectory.

We call it the digital twin, and anybody can sign up for it if you ca- if you don't have contraindication to MRI. So we ask you to come to do a four-hour full assessment from top to bottom, so you can understand, you know, how... your, your blood pressure. You can also understand how strong you are from your grips, from your legs, how fast you can...

in 12 minute you can run on a treadmill, so we can get an estimate of your cardio respiratory capacity. We do a full body MRI, quantitative brain, heart, muscle, lungs, [00:29:00] kidney, liver, the whole thing. We also take blood, and we give you wearables to use over a two-week period at home, so we can see over, you know, in your own environment, how, how are you sleeping, what is your respiratory function looks like, what is your glucose looks like, and your sleep pattern.

I wanna do

Shruti Naik: it. Yes.

Zahi Fayad: That sounds

Shruti Naik: amazing. Yes. Yes.

Zahi Fayad: We have a lot of people- Yeah. We have a lot of people signing up. And again, this is that platform that's helping us. Yeah. Yeah. Initially, it's going to be observational, so we see your trajectory. But over time, it will be used as, as you give intervention, either lifestyle, behavior or drugs or- Treatment

supplement, et cetera, what would that do to you?

Shruti Naik: Yeah.

Zahi Fayad: And then finally, it's, it's final, final goal is combining all the data together and create a digital twin of yourself, so you will be on a computer representative of your own health.

Miriam Merad: That is so

Zahi Fayad: cool. And that would be the one where we could do all kind of- Little

Miriam Merad: twin.

Zahi Fayad: Any... exactly. Yeah. So any kind of- ... any kind of new intervention you're thinking about or trying to look [00:30:00] at the effect of multiple, multiple intervention at the same time, you should be able to do that simulation. And you can

Shruti Naik: model it with your twin.

Zahi Fayad: And you will be able to model the twin. So instead of a mouse- So it will be an avatar

Shruti Naik: you can have a twin.

Zahi Fayad: An avatar of your health. Yeah.

Shruti Naik: Wow. Yeah. You know, it just sounds like there's so much innovation happening at Mount Sinai, and what I'm seeing is, you know, basic scientists, physicians coming together. Tell me a little bit about how a health system like this allows you to do this kind of trial.

It seems like a very unique place.

Miriam Merad: Mm-hmm. Maybe I'll say something about this. Uh, well, first, it is true that Sinai is a unique, uh, place. It's a very collaborative place with a very big focus on patients. It's a patient-centric type of medical school or academic center. We always think about how to improve patient's life.

So all the research that we do is centered on our patients. Uh, and, and this collaboration, well, first it's, it's fantastic to a- to have Jorina with us today

'cause it's really highlight, you know, how important it is for us never to [00:31:00] work in isolation. Mm-hmm. We don't work in isolation, you know. Jorina is bringing us, you know, the end metric.

This is the problem that my patients, uh, uh, really face. This is what I want. I want them to live better. This is the, uh, you know, this is what they are taking right now. You know, this is what excite them. Uh, and then we listen to this, right? And all our trials are going to be really designed in collaboration with our clinical partners.

Mm-hmm. Because ultimately what you want is serve your patient. Here it's not p- the- these are not patient. Mm. These are individual entering into old age. Yeah. Like us, unfortunately. Yeah. And, uh, and they want, want advice. And then even the type of, of measurement or intervention, you know, are also discussed with our clinical partners, you know?

So we... Everything that we will be doing and the way we will also measure outcome, of course there are all the biology and the measurement, but then there is the patients, you know? Mm-hmm. The patients, how he [00:32:00] feels- Yeah ... whether he likes taking all these medication, how... You know, all of this is integrated together.

So everything that we do, we do with a lot of granularity, means very close to the patients, and this is how we will progress and build this program.

Zahi Fayad: And, and this is really a partnership. I mean, we- Yeah ... I am working very closely with the clinical Healthspan folks to take the things that we are learning from research and then create, you know, we call them products because these are product that we give, you know, as a service to our patient and, and people that are signing up.

So we are, you know, we are building, you know, these clinical product and deploying them. And, and, you

know-

Zahi Fayad: We

Fiorina Kyritsi: take the one Mount Sinai very seriously.

Zahi Fayad: Exactly. We do take the Mount Sinai, yeah.

We

Fiorina Kyritsi: have broken the silos and we, we work together.

Zahi Fayad: Yeah, Brendan will be very happy with you.

Shruti Naik: I, you could feel it. I mean, the energy- Yeah

the excitement, it's palpable. Yeah. Mm-hmm. What you guys are setting up to do.

Fiorina Kyritsi: And also this is why I need scientists like Zahi and Miriam. Mm-hmm. I have younger, healthier patients, or even not so young, but healthy and they wanna remain that level of function- Mm ... and vibrance.

Shruti Naik: Mm.

Fiorina Kyritsi: [00:33:00] And sometimes I don't know, except from what we already know, to guide them to the next thing.

We're not treating- Yeah ... a, um, a illness at this point. Yeah. They don't come to me ill. We wanna make sure- Yeah ... that we push back- Mm-hmm ... any adverse outcomes and maintain function for as long as possible. Yeah. So I really need to have a roadmap on how to do this.

Zahi Fayad: Yeah. I mean, we need it. And so, so Miriam, I, I'm sure, you know, you, you came here, you s- you, you're, as an oncologist also, your, most of your interaction was with the oncologist, right?

Yeah,

Miriam Merad: yeah.

Zahi Fayad: My, most of my interaction was really with the cardiologist. I think it's great, and I continue to do this, but now I'm, you know, shifting my, my, my attention to the practices- Yeah ... what Fiorina has. Mm-hmm. You know, Fiorina has, with different patient population, not necessarily in a chronic disease type.

Yeah. Maybe also a little bit younger. Mm-hmm. They're interested in other thing. That totally converges with this healthspan initiative. Yeah. Yeah. You

know, looking at healthy or, you know, early signs. Early sign. So it, it all comes together. That's why [00:34:00] Sinai is great, because you have on one side incredible chronic disease management and treatment, and now we are building this whole aspect, bridging from the research to the clinical into a very new clinical field, which is longevity medicine.

Yeah.

N of 1 vs Real Trials

Miriam Merad: I want to a- just add something about the N of one studies. You know, 'cause we hear- Yeah ... a lot about these. And, and, and people sometimes, uh, mix, you know, N of one versus personalized. You know? Yeah. Everyone want to-

Shruti Naik: So maybe could you tell me- Yeah ... what is N of one?

Miriam Merad: Well, I think, you know, there's the explosion of this longevity effort- Yeah

saying, you know, "I'm going," you know, um, "These patients will be quite unique. I'm going to focus on these patients and, and measure what's good for him and give him this." And without integrating, I think somehow, uh, right? It's hard. The dataset- Mm ... in a larger group, you know? Yes. We f- we are not so, so different.

You- there are pattern of response, we know that, and grouping allows you to solidify the [00:35:00] data. Mm. Right? So I'm sure it happens to you that sometimes, you know, you eat this, whatever supplement, and you feel super well for a few days, and then three months later you don't, right? Mm-hmm. So the problem with this N of 1-

is that you conclude a bit hastily, you know, on, uh, on potential effect of... And that's super dangerous- Mm ... in medicine, as we know, right? So this clinical trial, when we talk about trial, is that we have a larger group of patients exposed to the same perturb, same drug or some- Mm. And, and then you, y- you have data that sh- goes beyond the heterogeneity that is intrinsic to all human being because we are exposed to many different things.

The, there's reasons why medicine started to really suggest that we do these clinical studies so that we have solid data.

Zahi Fayad: Yeah, randomized clinical

Miriam Merad: trial. And randomized trial. RCTs. Yeah. So people are now pushing back on them because they say, "Well, the RCT doesn't take into account my own, you know, [00:36:00] individual self."

So

how

Zahi Fayad: do I measure- There's a whole sci- there's a whole science, you know, for N of 1.

Miriam Merad: Yeah.

Zahi Fayad: I don't think people appreciate it. Mm. They just think because, as you said- Yeah ... I take one person and I observe.

Miriam Merad: Mm.

Zahi Fayad: But the whole aspect into trying to t- take out the confounding factors. Exactly. There's no way you're gonna be able to do an N of 1 without making sure that you're accounting for all the other factors that come into play.

Yeah. Statistically, I mean, there, you know, I'm not a statistician, but there's a whole domain and, you know, an aspect of designing... I think people You know, use that word, you know, lightly without thinking deeply Maybe you

Miriam Merad: can explain confounding variable- Yeah ... 'cause this is what people- Yeah ... don't really understand.

What is a confounding variable?

Shruti Naik: For example, Gavin- I, I also think you need to clarify what NF1 is by giving the billionaire example.

Zahi Fayad: Yeah. 'Cause

Shruti Naik: then it'll become very clear. Like, if you can... If you're like-- You can't say the name, but, like, if you're injecting yourself- Sure ... it may work. Because NF1 is not-- It's- Yeah

it's still hard for

Zahi Fayad: layperson. Okay. So, so the problem is this, and I think it goes together. I mean, if... So, so we don't-- So you say, "I'm [00:37:00] gonna measure something on myself, and I'm gonna use myself as the one to say good or bad," all by itself. So then you just have to think about what are you trying to do, what is that intervention that you're trying to do, and are there any other things that would affect this intervention that would cancel it out or would hide the...

So, for example, you can, as, as you were saying, people are taking all these supplements. They're mixing them all, like fifty, a hundred of them. Yeah. So and then how do you know which one is the one that actually was useful to you? Mm. I don't know. And maybe there are some other ones that are canceling the effects that- Mm

because you're mixing it all over. So you have to be very rigorous.

Miriam Merad: Maybe you took it in the morning. Yeah. And we know morning or l- Yeah ... at night, with food, without food, um, you know, there's a lot of things that interfere with, with results. And it's important to, yeah, there's- Yeah ... expertise into this. Yeah.

And so at Sinai, what we will do, everyone will be personalized. We are going, of course, we study human patients, um, you know, fully, and, and [00:38:00] Fiorina will pay attention to each of, of, uh, uh, of her patients, but we will also analyze, you know, collectively these data, right? Mm-hmm. Mm. And, and that strengthen the type of result that we, uh, uh, we obtain.

But we go back and slightly that we will say, "Well, we see three different pattern of response." Mm-hmm. Mm. And we will group people in different type of patterns of response. Mm-hmm. Mm. You know, we don't... It's not because you do a big clinical trial that you don't study, you know- Yeah ... individual response or group responses, right?

We pay attention to all the data point that we have. And

Fiorina Kyritsi: also, don't forget, humans have very, you know, y- you know, shared pathways of, uh, of aging. Exactly. Yeah. So it's not just one person.

Miriam Merad: Yes. I mean, there's evolution,

Fiorina Kyritsi: right? It is... Well. Yeah, there is... There is

Miriam Merad: evolution.

Fiorina Kyritsi: So that, that way we can- Yes ... uh, generalize our results-
Yeah

and be able to help more-

Miriam Merad: Yeah ...

Shruti Naik: people. Yeah. I... What you're saying is really profound. Like, in order to have personalized medicine, you actually need to know how everyone responds.

Miriam Merad: Yeah.

Shruti Naik: Yeah. And that is, I think, a really-

Miriam Merad: Yeah ...

Shruti Naik: important takeaway that I didn't know [00:39:00] before. Yeah. I thought personalized medicine was just you study me- Yeah

and me, me, me, me, me. Yeah. But if you don't have anything to compare it to- Yeah, that's right ... then me, me, me is- Yeah ... useless.

Zahi Fayad: So but h- uh, let's also maybe dive a little bit more. You, you could do N of 1 experiment in the proper way if you can account for everything that's around. Which mean that I can understand everything that I'm doing in my body-

Shruti Naik: Mm

Zahi Fayad: and how what I'm doing is affecting these different things.

Shruti Naik: Mm.

Zahi Fayad: So eventually we may be able to get there, but you need to understand a lot of the pathways, and you need to document. Mm. So you have to have a very precision-

Shruti Naik: Mm ...

Zahi Fayad: measurement and continuous measurement to be able to tease out how they are working together or interfering with each other.

And we are

Miriam Merad: not there yet.

Zahi Fayad: And we are not there, no. That's a very difficult problem.

Shruti Naik: Yeah. Okay. Yeah, yeah. So you're solving that problem. And hopefully-

Zahi Fayad: Some of it, yeah.

Shruti Naik: Well, well, hopefully, in a, you know, in five to 10 years, we will have... we'll be closer to that- Yeah ... N of 1, and we'll be closer to understanding w- how the individual [00:40:00] responds based on how the collective responds.

Miriam Merad: Yeah.

Zahi Fayad: I have to give credit to, you know, clinicians like Fiorina, who are really in a new field. I mean, this is a very new- Yeah ... clinical field. There's so many things also that- Yeah ... a lot of noise in this field at the same time. Mm. Uh, so trying to do the right thing as a physician is not always that easy.

But

Fiorina Kyritsi: that's why it's exciting. Yeah, yeah. We're trying to exploit and do it- Exactly ... you know, thoughtfully and also-

Shruti Naik: I have to say, like, Fiorina, you know, innovating in medicine is- I think the biggest calling that you can have- Mm-hmm ... you're helping people improve their life. It's a

Fiorina Kyritsi: combination of innovation, also myth busting- Myth busting.

Yeah, exactly ... because that, that comes a lot nowadays in our clinic.

Shruti Naik: Exactly.

Longevity Myths and Basics

Shruti Naik: What's the craziest thing that you've ever been asked?

Miriam Merad: Oh,

Fiorina Kyritsi: good question. If, uh, someone, uh, gets a transfusion of blood of a younger person- Yeah ... if they can, uh, get... feel younger and- Yeah ... decrease their age. Young

Shruti Naik: blood.

Fiorina Kyritsi: Young blood.

Shruti Naik: Yeah. Wow, like Blood Boys.

Fiorina Kyritsi: Yes. Yeah.

Shruti Naik: Wow.

Fiorina Kyritsi: Yeah,

Miriam Merad: yeah. Knowing that in this, uh- [00:41:00] Yeah ... yeah, lot of things can also be infused. Yeah. Right. Yeah.

Shruti Naik: Right. There's dangerous things- Be careful ... in blood. What's the really obvious thing that you recommend to your patients that they think is crazy?

Fiorina Kyritsi: Oh, they roll their eyes, because I'll go to-

say exercise. Mm-hmm. And it's not just, you know, a lifestyle add-on. I, I think it's like the longevity multi-drug, multi-therapy we have- Yeah ... now available, it affects so many different pathways. Improving your blood pressure, your insulin sensitivity- Cognitive function ... health- cognitive function, supporting the muscle strength.

Mm-hmm. Uh, or improving- Cardiovascular ... your cardiovascular risk. Yeah. Cool. So it, it affects- I was hoping you were gonna say- ... so many different pathways.

Shruti Naik: Cardiorespiratory, yeah. No, I was hoping you were gonna say something really fun, like candy. Yeah. But- That's

Fiorina Kyritsi: why I told you they roll their eyes

Shruti Naik: when I say that.

Yeah, yeah.

Zahi Fayad: But sleep also, same thing.

Shruti Naik: Sleep. Yeah.

Zahi Fayad: Okay. But, but it's good that people are starting to appreciate this. Yeah. They're, they're hard. I mean, not everybody can, you know, stick to the s- [00:42:00] to the exercise regimen or to the sleep, you know, uh, hygiene. So then easy, tell them, "Hey, take, take 5,000 steps, 7,000 steps a day."

That's not difficult. That's easy. Mm. That's accessible. That's cheap. Yeah. All you need is your legs and your shoes and- Yeah ... and, and then fresh air and that's

Shruti Naik: it. Yeah, walk a little bit more.

Zahi Fayad: Yeah.

Shruti Naik: Move a little bit more. Not extreme effort, just be consistent

Zahi Fayad: with

Shruti Naik: things.

Zahi Fayad: Yeah. Mm-hmm.

Shruti Naik: All right. Yes, definitely.

Well, I wanna thank you all for your time.

Zahi Fayad: Thank you.

Shruti Naik: Thank you for having us. Um, we're gonna end it here on, on a high note, which is, you know, you're innovating the future. You're innovating health. Yeah. And, and I'm really grateful for your time and for you to be here.

Miriam Merad: Thank you. Thank you. Thank you so much.

Thank you for inviting us.

Closing Takeaways

Shruti Naik: Here's the bottom line, folks. Aging is not a mystery anymore. It's a biology. Measurable, tractable, and increasingly something medicine can act on. What I hope you take away from today is not a protocol or a supplement list, but a clearer picture of where the science stands. The gap between what's proven and what's being sold is still large, but it's [00:43:00] closing, and in this series we'll show you exactly how.

This has been a special edition to the Vitals podcast on health span and longevity. I'm Dr. Shruti Nayak. To learn more about our clinical trial, scan the QR code or visit the link in the description below.