Reversing Aging: Dr. Greg Fahy's Research on Thymus Regeneration and Immune Health Transcript

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Introduction to thymus regeneration

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Although, you know, Barzilai wanted to do that with time, but he never really got that off the off the ground. It's still not off the ground. And here we are many years after we completed our trial.

But so I was struck by a paper that came out in 1988, I think it was in PNAS that showed that this atrophy of the thymus, which we call thymic involution, can be reversed with growth hormone.

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Functions that had declined by 80 or 90% was also restored to the same level that they were at the age of three months of age, which is a young a young rat.

So I thought, wow, this is fantastic. Everybody just got to jump on this and we're going to all be young again. But nobody paid attention to this whatsoever.

So I eventually did an experiment on myself and regrew my own thymus and part and publish that eventually. But still, nobody did anything about it. So eventually I met up with Bobby Brook and we started interviewing immune, and we started a human clinical trial to see if anyone else's thymus could be regenerated besides my own.

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Get ready to unlock the secrets of lifelong health and vitality. This is Doctor Talks, real talk from real doctors on the issues that matter to you most.

Hi everyone, and welcome back to Rad Cars. I'm your host, doctor Melissa Peterson, and together we are going to continue to explore the frontiers of longevity, regenerative medicine and biological age reversal.

Today, we have the privilege of speaking with one of the leading figures in aging and immune system rejuvenation. Our guest is Doctor Gregory Fahy. He is the chief scientific officer at Intervene Immune and a pioneering scientist in the human thymus regeneration and immune system restoration.

His research has challenged conventional aging paradigms for proving that targeted interventions can reverse biological aging markers, a discovery that could redefine how we approach longevity medicine.

I am so honored. I am so thrilled today. Get ready. We are going to dive into his breakthrough studies on thymus regeneration. We're going to look at how it affects aging and what this means for the future of immune health, longevity and regenerative therapies.

Doctor Greg Fahy, welcome to the show. Thank you, Melissa. It's such a pleasure to be with you today. It is so my pleasure. Okay, so, you know, I think before we dive into your groundbreaking study, let's your work is really rooted in looking at the role of the thymus gland.

And I believe it's, you know, fundamentally one of the key drivers in how we age and how we can potentially have greater governance over that process.

So maybe you can first peak our curiosity as a listening audience to appreciate what is the thymus for those that may not know, and how is it really affecting aging?

Sure. So the thymus is the center of your adaptive immune system.

What the thymus does and why it declines

It's a gland that's located about here under your breastbone, and it's responsible for educating your cells that eventually turn into T cells. So there are cells that come out of the bone marrow that go go through your bloodstream.

Some of them turn into red blood cells, and others go into the thymus and get turned into immune cells. So these cells are necessary to fight your, invading pathogens such as bacteria, viruses.

But they can also kill cancer. And unfortunately, we know that these cells are necessary for your survival. And they know that we know that the function of the thymus and producing them is very important for your survival as well.

But, as we go through puberty, certain biological switches are thrown and your thymus begins to deteriorate. So when you're tan, your thymus is about as big as it's ever going to be.

And by the time you're 20 and 30 and 40, you've lost the vast majority of the functional part of your thymus. It's been replaced by fat. And we're not totally sure how this works, but it's certainly related to the production of sex hormones as you go through puberty.

And those sex hormones, of course, then persist through the rest of your life and may continue to slowly envelop your thymus for the rest of your life.

But the good thing is, we found that there's a way to overcome all of this so you can still have good sex hormones and probably retain your thymus at the same time.

Which seems like a good thing. Absolutely it does. Yeah. It's so interesting to think that this, this gland that is so pivotal in immune modulation and immune function just starts to get smaller when we need it the most, right?

As as all of the demands of life and all of our exposures continue to accumulate and accumulate and put more wear and tear on our system, it's when we need our immune system to be functioning at its peak.

And so it's it's it's kind of a, an unfortunate party trick. Yeah, you could say that. Yeah. If you look at how likely we are to die at any age, the minimum in that mortality risk peak is at age 12.

And then as soon as your time to start to balloon, your risk of death starts going back up again. Yeah, but the thymus is pretty inefficient because it has to throw out 98% of the cells that it makes so that they do not attack you.

And so some of the arise that it's the energy demands on the body that cause the body to shift its emphasis from immune system maintenance to reproduction.

When you go through puberty. And in our ancient past, of course, we didn't live that long, so that trade off might have made some sense. So it just doesn't work for us anymore because we live much longer.

Yeah. Interesting. And energy demands on the system is is a key part of really kind of how fast or slow we are biologically aging. Right. Because the more demands I call it kind of do we have enough gas in the tank to keep up with the demands of life?

And as we chronologically move through our days or weeks or months, more and more comes out us in life. And so there's more and more. But yet the busier we get, the, you know, the more demands that come.

We don't necessarily tend to keep up with them as well. More things fall through the cracks. We're not eating as well. We're not sleeping as well. We're not managing our stressors as well.

And so it's as if there's more and it's requiring more energy expenditure. Yet we don't necessarily have that energy, that gas in the tank to really keep up with it.

And so the kind of we're moving faster and faster in that, that break down. That's a really interesting thing. So you okay. So there's there's a really actually it's just just on that point.

So one of the reasons that our energy production doesn't keep up is that we become deficient in NAD and, but NAD is depleted by immune cells that are more active when our thymus doesn't work well.

So there's a lot of different ways that the thymus ties into aging in a general way. Oh, okay. So let's keep going there because you just brought up something that doesn't actually get spoken about enough, but let let's take our, our listeners on this lovely journey, because where you've you've probably heard a lot of things about this brilliant man, but when, you know, the light shone really brightly on him is when he kind of had this groundbreaking discovery, which is we actually can reverse the pace of biological aging.

And your trim trial. So tell us about the trial. You know, putting that together leading up to that and really kind of walk us through those key findings because you've been teasing us a little bit about this role of the really what's happening with the immune cells.

But then there's kind of this trade off with hormone production. And in that study you kind of put this to the test. So walk us through this. Yeah. So so the Trim study was designed to see if some aspect of human aging could be reversed.

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So eventually I met up with Bobby Brook and we started interviewing immune, and we started a human clinical trial to see if anyone else's thymus could be regenerated besides my own.

And but by that time I was more sophisticated. So growth hormone is lovely because it regrows the thymus, but it has a side effect. It causes insulin sensitivity to go down, which is the same thing that happens with aging.

As we become older and older, we become more and more sort of diabetic inclined. And so I didn't want that to be there to sort of mess up the effects that we were seeking.

The Trim study and reversing aging markers

And so I had this thought that I test it on myself. The thought was, it goes like this. So when we're old and we get growth hormone, we become quote unquote, diabetic.

In other words, less insulin sensitive. But when we're young, we have tons of growth hormone all over the place, and we're fine. We're not diabetic at all.

So what's the difference between being an old person getting growth hormone and being a young person who already has growth hormone? And I thought, well, there's another big difference between old people and young people, and that's that young people have tons of DHEA.

It's the most produced adrenal steroid hormone that there is, and people didn't really know what it was for. And it serves as a precursor to certain other hormones and so forth.

But I thought, well, what if one of the major effects of DHEA is to block the diabetes genic effect of growth hormone? So I tried it on myself and found that it completely reversed the diabetes genic effect of growth hormone on myself.

And so when we did the Trim study, we included DHEA in combination with growth hormone to regenerate. The same is that our volunteers. But we also back that up with metformin because metformin directly increases insulin sensitivity.

And therefore it would be very logical to combine with growth hormone to block the opposite effect of from. So we did the study and we found not only did DHEA and metformin both help to control this diabetes genic effect of Rotherham and but as a consequence or as let's say in parallel to the effect that we did achieve of thymus regeneration, we also saw these other amazing effects including reversal of epigenetic aging, as you referred to.

So it turns out that the thymus is tied in in some way or the other to body wide aging. And maybe it's in parallel to other effects of the drugs. Or maybe it's partly because of the regeneration of the thymus.

But we did see an improvement immune system function, improved ability to fight cancer, at least in theory, and in a body wide aging reversal, from what we could see at the time, the longevity revolution is about more than just searching online for a few hacks, or any one of us moving our biomarkers in the right direction.

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Take advantage of lower advanced pricing now at Round fest.com. Okay, so this which is incredibly you know again congratulations. So before I dive into some of my clinical questions, let me ask you when you actually achieved this and you found these results like what what was that like for you as somebody who'd started in the 80s and people really weren't listening and you're kind of all right, you're a couple in and now this happens.

What was that like? Well, it was pretty exciting. You know, we were very happy, very pleased that that happened. So we actually had some difficulty arranging for those epigenetic tests to happen, because Steve Horvath was the guy who invented all of those clocks, is very, very busy.

He was constantly being sought out by people at Harvard and Stanford and everybody, all the name institutions all over the planet who wanted to measure aging.

And so when we contacted him, we kind of didn't register. And so we had to sort of catch his attention by starting a seminar series at UCLA where he was working and inviting him to speak.

And then when he came and talked to us, we got to know him. And after we did that for a couple of years, he volunteered to actually measure biological aging in our subjects, and we really would then not know what to expect.

Or I wanted to do it just to see what would happen, but I my expectations were not high. I was hoping that we would see some something positive, but when Steve got his first results, it just kind of flawed.

And because he had never seen aging go in reverse before, he had seen it slow down in certain circumstances but never go in reverse. And certainly never go in reverse.

And a human being. So he did three other clocks and they also showed the same thing. And then later years, after we published the study, Steve actually went back and looked at a fifth clock, which is the plasma based version of the fino clock of living, and showed that we got the same aging reversal with that, which is a completely different clock.

It's not based on methylation of DNA at all. And so that's pretty strong evidence that something interesting was going on. Are you ready to redefine aging and unlock your full potential as a longevity leader at the Human Longevity Institute?

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If you're ready to join the Longevity Revolution, visit Human Longevity institute.com to enroll and become a practitioner today. Absolutely. And so and the evolution of your your clinical, you know, just kind of assessment how so from that initial trial.

Well how has your work been progressing. So based on your original findings, what's been the next iteration. Yeah. So we wanted to show that we could reproduce those effects.

And also that it wasn't just for men that we could do this in women also. Yeah. And so we started what we call trim X, which is the X stands for the extension of the trim trial.

Nice I like that. Yeah. Trim. Trim stands for thymus regeneration immuno restoration and insulin mitigation. Just to give you the reason that that we called it that.

So we wanted to show that we could do the same thing in women and also in older people, because one of the interesting things from our study is we saw no effect of age between the ages of 51 and 65 on thymus regeneration or immune cell reconstitution or epigenetic aging reversal.

And so we wanted to know if there is an upper limit. So we started the new trial with an upper limit of about 80. And we also included people younger than 50.

We have a couple people in the hopper who are under 50, but most people are are over 50. So far. Right. And we actually have presented our preliminary results at a few meetings now.

And they essentially reproduce the effects that we saw before, in some cases more strongly than what we saw before. Now, the women, we only had six women in the study, and not all of them had complete data.

So we don't have we have too much noise in the data. Know that in a couple of clicks we did see, aging reversal in the women, including the done it in pace clock, which is one of the ones that predicts whether you're going to get cancer or die or lose your marbles, or become unable to perform your daily functions of life.

So it's very encouraging. But we still have a long ways to go. So we so we are now looking at different flavors of trim in which we were capturing more and more data all the time, noticing things we didn't notice the first time.

We're seeing if we can modulate the treatment, a way to make it even more effective than it was before. And we have some pretty exciting things we're looking at.

But we're we're we're still in the process of looking at those things. Okay. So so let's break this down for a moment for our listeners, because we've got a mix of of practitioners, enthusiasts.

But we all want to know, you know, how do we live better today for longer. Tomorrow's. And so all right, we we understand scientifically that this beautiful thymus gland invalids.

And that doesn't really help us as we chronologically age. And there's also a hormonal component. So your study has helped us to show, to see very clearly.

Yes, we can regenerate this gland and we can actually kind of help to give it more, more of its optimal function. The way it's intended to keep working, so that now we kind of help offset.

So have you found what what would you say? And I understand you have a set protocol. So I'm not trying to steer us away from that. But when we just think about thymus gland.

So there's a lot of things out there. I for example, I use with my my patients myself. I teach a lot on this. I'm very curious of your thoughts on thymic peptides.

So have you found some some utilization of of those that have helped with improved thymic expression and function? Well, yeah. Perhaps you and I can collaborate on this a bit, because one of the reasons we have not looked at thymic peptides is accessibility.

You know, can we acquire them? Are they suitable for human, you know, investigational use, that sort of thing. So I learned that that Bill Falloon has started looking at Thymus and Alpha one recently.

And so I learned from him how to get that. But maybe we can work together and and do a little collaboration because I'd love to. So there's all kinds of uses for these things.

And yeah, we're very supportive of thymic hormones. They help the T cells do the job that the T cells need to do. So although we we apply our technique temporarily.

So if we apply it for a year to a year and a half to regrow the thymus, repopulate the T-cell compartment, what we'd like to be able to do is to use the thymic peptides between bouts of thymus regeneration.

Yeah. These cells that we produce are in optimal condition until we grow some more. So on that. Yeah. Okay. You know what. And I'm curious, it might even be more interesting to look at some of the thymic bio regulators.

So because they have they they impact epigenetic expression like they're able to go into the cell versus just be a cell signaling molecule. So there could be an even more targeted utilization that really pairs up with your work.

So that's just me thinking out loud. So we'll definitely have to circle back on that. Because also, you know, my brain goes to thinking, okay, how do we so as with anything, right.

All of a sudden when things aren't working well the question is and I love you, your whole work is around. Can we regenerate it? Right. So we can we bring it back online.

Not just not just give it some support, but can we bring it back online? And you have found that yes, we're able to do this. And and so part of it is I want to kind of unpack today and pick your brain to say for our listeners, how can they better help their how can they better help their thymus potentially.

What are some things? Have you found things in addition to, you know, going ahead and bringing in the hormone and bringing in the growth hormone? Have you found anything else that just naturally would slow that progression or could help to maintain a healthier state?

Or have you not found anything in your work? There's one thing that we have investigated. We call it the novel agent. That might have some benefits in that regard, but we we don't have the data for it yet.

Okay. No, that in myself and in a small number of other people, it seems to reverse plasma pino age, but it may have an effect on the thymus as well. And we have to look at that in more detail.

There's a drug that might assist the growth hormone to do its job. It might allow us to regenerate the thymus with a lower growth hormone dose. Therefore your growth from one side effects.

But we're just beginning to launch that trial now. We don't have the first person enrolled in it yet, but we will hopefully have that in a very short time.

But, in terms of what's out there in the general accessible, you know, like alternative health realm, there's really nothing that's been demonstrated to work, to any great extent.

There might be 1 or 2 things that the patient may be having some ability to work, but it's nothing that I could substantiate at this point. So. Got it.

Eventually we'll we'll circle around and sort of try to tie up any loose ends like that. But right now we're we're going sort of for the big guns first and then the little things as you should, as you should, I love it.

No. Continue. Keep doing your work. We're we're all following with with the bated breath to see what happens next. So in kind of looking at the pieces so far of your protocol, the next thing I want to dip into.

And so let's go to Growth Hormone for a moment. I'm a huge advocate of of growth hormone, especially as we chronologically age. Right. And so there's there's some sides of the camp to say, you should not take growth hormone because it's going to help to grow to grow tissue.

And of course also and here's the rub. Right. So as, as that thymus in values as we have less kind of immune surveillance and we have a greater likelihood of those diseases of aging that are associated like cancer now all of a sudden is saying, well, it's not really something that we want to be mixing together.

Follow-up trials and maintaining results

Although, you know, many will say, well, there's actually not really solid studies that show one is causing the other. So let's first talk about your thoughts, your opinion, the research on the safety of exogenous growth hormone.

As we are as we're aging, we should take it right. Risk outweigh the benefit. Yes, there's several dimensions to this, but one of them is just the superficial thing.

So what does it say on the label when you buy a growth hormone and you look at the package insert which is approved by the FDA, and all of that is cancer risk, a one of the side effects that the FDA recognizes for growth hormone.

The answer is no, it is not. All it says on the label is that you should not take growth hormone if you already have cancer. I think we would all agree to that because, yeah, more rapidly.

But there's no evidence that it actually increases the rate of cancer or the risk of getting cancer. There's something called the Growth Hormone Research Society, which looked at the literature on this as well.

And they find no increase in cancer. They find no increase. Yeah. There's other studies that show no increase in the risk of recurrence of a previous pituitary adenoma, which is the only one that they've looked at.

But at least as far as it goes, that's reassuring. And so that there are difficulties with those kinds of reassurances and that those are generally observations made on people who have not been on growth hormone for extended periods of time.

It's relatively short term, like a year or so. But on the other hand, that's all we're advocating because it only takes about a year to regrow your thymus.

And so if you regrow your thymus and stop, then you shouldn't have any more cancer risk than has been documented so far, which is essentially none. And then one of the other dimensions, Melissa, is what happens in animal studies.

So as you probably know, rats and mice tend to die of cancer as they get older. That's one of the major mechanisms of their death. And so you'd think that giving growth hormone to a mature rodent might shortens lifespan by giving it cancer, but that's not the case.

So if you give a rat or a mouse the same dose of growth hormone in absolute terms that you would give to a human being, sort of like 4000 times the human dose of growth hormone.

And you follow it for its entire life, the number of cancers that you count in those animals is exactly the same as what you count in control animals.

Now, the cancers are bigger, but but there's no more of them right now that you know, we don't want to give growth hormone to to people that already have cancer.

Right. So another dimension to this is that there's a certain risk that if you go on growth hormone and you have preexisting cancer, that you don't know about it, that you may grow that more rapidly.

But there's also something else to consider, which is that most people don't have preexisting cancer at any given time, that our risk of getting cancer increases as we get older.

And that's due to the decline of the immune system. Right. So you have to take you can't just play it safe. You got to take of those, take a small risk.

Now have a big chance of saving yourself later in life. Yeah. And and what we're really you know, there's there's an interesting let's, conversation here.

The step one. It's okay. Rejuvenating, regenerating the thymus. And so again your protocol, you're looking at it in a short term relatively short term a year.

And so you get it to this point. And now we can kind of take the foot off the gas. And now it's operating as it should. Again. That's great. Of course.

Interestingly enough, just like our thymus and values, growth hormone levels also decline. It kind of in step almost in lockstep with that actually. And yet there are so many benefits of what growth hormone provides to our system.

And just like you said, man, okay. Without it. Right. We're not with we don't have a healthy thymus, Glenn. We have

a greater risk of these diseases. And we don't have the growth hormone to keep the thymus glands like so kind of which, which way do we want to roll the dice.

And I think that there's a really interesting conversation that there are so many incredible benefits that growth hormone can add to the body, in addition to supporting that thymic function.

And so I guess I'm curious to you of, you know, one of the things I look at a lot again, so I think from a peptide standpoint, we have growth hormone analogs like we.

So we can kind of use these stimulus like these signals. Right. That will help to naturally stimulate the increased production. And so like Tessa Marilyn for example, FDA approved.

And we know that that's something that can help to naturally increase those levels. And so once you've done your intensive cycle, I wonder if there's again, some benefit to rotating in some of these other elements.

Because for all of us, we want to get there going. No, it's not a one and done. It's not static. Right. Because every day we're above ground. We are we're dealing with all these demands and energy utilization and, and, and and so we can go three steps forward and we can slow the two steps forward rather three steps back.

If we don't have a proactive way to kind of what I want to say, maintain the the results of the investment that we just went through. Right. Like so we got the we got the thymus back, but we don't want to just invalid again because it will.

So let's talk about some of the strategies that could come into play in the work that you've done to maintain and, you know, support those results that you've been able to achieve.

Yeah. So on on that topic, you know, I read Redman's paper when it first came out in 1980, and I think it was the New England Journal of Medicine. And he said that growth hormone administration, a complex changes in the body that were equivalent to 20 years of reversal of aging that was based on skin thickness and various other things.

And he got in trouble for saying that, but he objectively, what he said was true. And so as I looked in the growth from and more and more every thing, it did seem to be contrary to what happens with aging.

So I thought of I started thinking of aging as a growth hormone deficiency disease. But then I ran into this paper in science that said that people who are in the upper quartile or percentile of, of IGF one levels have a 50% increased risk of prostate cancer.

And so I thought, well, you know, that's kind of weird. So I kind of backed off on that. But you have to realize that that's lifelong exposure and that's not what we're talking about.

Even in the paradigm that you're talking about, which we're trying to intervene in aging, you know, still introducing the extra growth hormone later in life.

Not from the time that you are, you know, going through puberty and all that kind of stuff. And so it may be a different story. I think it may be a different story.

So, so our reasoning is that if you can regrow the thymus and generate new T cells, and those T cells last for, you know, potentially even decades, that you could then allow the thymus to slowly invalid again, knowing that those T cells are going to last a long time.

And we hope that we haven't shown this yet, but we hope that if you regrow the thymus once, then there's going to be more of it left when you go back to regrow it a second time and you'll be even able to do a better job the second time that you did the first time.

This will preserve the ability of the thymus to function into extreme old age. You should be able to cycle that regeneration on and off over time, and make sure you always have a good supply of healthy T cells.

And then if there are any negative effects of growth hormone that we're not aware of, and people have pointed to various things and we should talk about that, because what we need to understand is what the mechanisms of those detrimental things would be.

Yes, I think that the mechanisms are very indirect. I think that there are things like insulin insensitivity that we can do something about. So I think that those, those indirect, you know, problems can probably be overcome.

But as we work through all of that, we can still keep ourselves pretty safe and pretty secure over the long run. In other words, we can kind of have our cake and eat it too.

So I will say one other thing, Allison, that is that we're very lucky and that we have two guys who went through the original Trim trial and then re signed up for trim X.

Oh, good. And so trim X, you know, started about five years after the first trial had had ended actually. And so now we have data on their biological age stretching over eight and nine years.

First going to the trial and then back out and then going through the second. So between the trials there is a little bit of a sort of a backslide in there, I think.

But then it it recovers again when you go to the second trial. So the upshot of this is that the first guy hears about the same biological age after eight years as he was at the beginning of everything.

And then the second guy is younger, biologically, after nine years than he was at the beginning of it. So in terms of being able to maintain this effect, even though we treated for a year and then a year and a half, we're able to maintain it for much longer than that.

So the effects last a long time. In other words, when you turn back the clock, it doesn't just immediately rewind itself. When you stop doing that, it stays backwards for a considerable period of time, which is very exciting in and of itself.

So we have much more to learn, but we may be able to, you know, combat aging without being too strenuous about it. All right. So yeah, get a little bit safe.

Yeah. I mean, the the approach is actually it's quite simple. It's intelligent. It's it's actually very affordable. Also like when we think about an intervention and what could be utilized, you're not bringing something that's crazy I mean it's phenomenal.

So I'm excited to to see the the next phase of the results with trim X. Let me ask you. And I know I get a little bit more time with you. So I'm just going to take it for every moment I get here.

Let's talk for a moment on the importance of DHEA, because you brought that up and it's I agree, it's such a powerful, beautiful hormone. So explain it obviously in conjunction with the thymus.

But let's really just look at that, that hormone and the power that it can play in our bodies overall that that will allow us to to stage instead of age gracefully versus age rapidly.

I like that. That's very good. Melissa. Yeah. So one interesting thing about DHEA is that it makes women feel good. If you go on 50mg a day, women report having an enhanced sense of well-being.

There's something about it that's that's, that's pushing the right buttons and the female brain. I think that's really good. That's got to be a good sign of something.

But women convert DHEA and to sex hormones, and so you have to limit how much you give to women, just because you don't want to get into other issues.

So there's this whole thing about hormone replacement therapy for women, estrogen replacement, and whether that increases cancer or not, whether that's related to the form of estrogen or not.

But I think it's it's something that you have to be cautious about. So yeah. So you don't want to do you don't want to push into realms of you don't have to go there.

But, you know, if you look at both men and women, what happens to us as we get older? There are a number of studies that we found, that attempt to correlate how we do, with what happens with the VA.

Growth hormone, DHEA, and safety considerations

So if you levels are either low or they're too variable, they're bouncing around a lot. Your risk of being hospitalized is way up. Your risk of dying is way up.

Your risk of having various other maladies is way up. So nobody knows why these correlations exist. But the implication is that you need not only to have reasonable amount of DHEA in your body, that also reasonably stable supply of yoga to keep things going in the right direction.

Yeah. And one thing that might be relevant is that DHEA tends to facilitate utilization of fatty acids. So it may help us to prevent ourselves from getting fat as we get older.

An accumulation of fat tends to cause insulin insensitivity. And so it may be that, you know, we can sort of stretch out our light, our longevity and our health by sort of, controlling the effects of a natural aging tendency or getting fat as we get older.

I like this. So I'm just I'm just going to free flow on something. I'd love your feedback on it. So when I think through kind of the the hormonal steroid pathways and I think about the positioning of DHEA, you know, one of the the reasons that we can have such a depletion is when we have a high cortisol demand.

And so typically that does seem to be a little higher in us ladies, as we multitask a lot and wear a lot of hats and have a responsibility, is not to say that men don't as well.

But I think that we find ourselves in more situations that we pull in many ways. And so maybe we have a higher stress load, even if it's a perceived stress load.

And so and of course, now we think of a accumulation, I call it the slow drip over time. So obviously we tend to see more and more of that. And so year over year we can have a greater drain on our, our ability to, to keep up and make these hormones.

And do we have the kind of the right building block, so to speak. So I, I'm curious. I'm just thinking out loud, like I said, that especially because you were saying women respond so favorably to taking DHEA that for any of us.

And it's also this really key piece in that insulin sensitivity response is part of what you're finding in your work. And so I'm thinking as we age, as we have greater stress loads and we have to kind of shunt that over, we it can also impair the the formation of our sex hormones.

Like you said, it does play a key role in that as well. And and so if we have too much cortisol that's always dumping glucose. Right. And if we don't have enough data.

So there is this really interesting way that it works in a a few different ways throughout the system. So I like the advocation. Do you think if maybe we look at maybe just a more proactive dosing, like, have you done any work or looked at any research around maybe a more looking at that as a lab marker earlier on and maybe some of our

general health workup, some kind of thinking through a longevity medicine framework.

I'm just taking a moment to get to my question, because I'm just thinking this out loud. The importance of looking at that hormone, specifically because it it's it plays a role in multiple pathways.

Do you think it could have benefit if we were low dosing it, maybe starting a little earlier. It could have some very good preventative elements to it that would that would be smart to consider or look at.

Yeah. I mean, that's what all those, epidemiological studies would strongly suggest. If there's a correlation then there may be causation associated to that.

If there is, then therapeutically you could you could influence that by by dosing it to, to make sure that your DHEA levels don't decline beyond a certain point.

Yeah. No, that's a question as to what's the optimum level of DHEA in the body. It's hard to say because maybe the aged body needs levels are slightly different than the younger body, but all of that can be looked at.

The point being that if you never look at it, you'll never know. So correct. You've got to start somewhere. And I agree. And so based on the epidemiological studies, we can look at the levels of DHEA that were correlated with better health and just try to achieve them, you know, through artificial dosing of DHEA.

And and then over time, you know, if you pay attention and you see what the outcomes are, you'll find out if it works or not. So I think it definitely should be done.

Yeah, I love it. All right. Well let me let me pick your, your beautiful brain on some personal things here. So you're out there, you're in the industry.

You're looking at the research. You were the the OG in like literally opening the door, you know, on the cover of like MIT magazine. Like we we can reverse age.

There you are. There's your your study and your your your work. So what do you believe to be the most promising? Like you're you personally are so excited about what's coming down the pike in this lane of longevity and healthspan extension, so that we truly can live better today for longer, longer, longer tomorrows.

There are so many things, you know, it's hard to narrow it down. And and the answer depends partly on what's readily available versus what's a more distant prospect, but still very exciting.

So yeah, you know, it might point to just a few areas right now. So obviously Reprograming is something that's got a lot of people very excited. And there's some very interesting whole animal data on that, that that shows that there may be benefits, but it's early days and it's still perhaps a bit dangerous.

But you have giant corporations now, investing big, big dollars into, into to working all of that stuff out. So we're going to have to have a wait and see attitude on that.

But that's that's a biggie if that can be done. Because essentially, you know, just to make sure your all of your viewers know the story, Yamanaka in Japan discovered that by using certain factors that are present in embryos, you can actually turn back the biological clock of any cell, basically back to an embryonic stem cell.

So you take an adult cell and you convert it all the way back to a baby cell. Essentially. And so what Ocampo and Belmonte and those guys did is they tried to cycle.

Yamanaka factors up and down in actual whole animals that were old to see if they could. Yes, sort of take the whole body back in time. Not all the way to becoming an embryonic stem cell, right?

A little bit in that direction. And it seemed to work, but they didn't live super longer than they did before, and but

they didn't seem to have any difficulties, with that, as well.

And some of the functions that they measured showed rejuvenation effects. So there is some potential along the lines. But and it's very interesting not only because of what it might do therapeutically, but also what it means in terms of our ability to understand what aging actually is.

You know, I've held for my whole life that aging is basically a cascade of chemical events that you can intervene in, in reverse. And this is sort of consistent with that idea.

And one it's one approach, but you can't you can't chew on that right now. You can't do that. So another thing that you can chew on right now is nad so gums, you know, in the Sinclair lab in 2013 showed that the body becomes depleted of NAD cells, become depleted of NAD as they get older.

It's sort of the opposite of the free radical theory of aging, free radical theory that says you need to use a lot of antioxidants so that NAD is an oxidizing agent.

So we become insufficiently oxidized as we get older not to oxidized and very interesting. And if you restore that using precursors to NAD, then everything you measure about aging goes in reverse, including in animals.

Vascularization comes back. One of the things that happens to us as we get older is we get poor circulation with all kinds of problems cell loss, organ shrinkage, all kinds of stuff.

It's all reversible, just by using NAD precursors, apparently, at least if you're a mouse. Now, to achieve the same levels of effect that you've seen in the mouse studies, a human would have to take like 50g of this stuff.

So so there's some dosing issues, but all that's being looked at and worked on right now. So it's a very exciting area of interest. And just as a footnote to that, in our original study, we noticed that, cd38 cells which deplete NAD in organs were diminished by thymus regeneration.

So the theory was that maybe one of the reasons that we saw reversal of aging in our patients is because we're actually storing restoring intracellular levels of NAD.

We we still haven't done laboratory studies to to substantiate that yet. But now we have a laboratory. We can begin to look at those studies as we go forward.

So so that's very interesting in kind of the opposite of reprograming, in the sense that this is something you can go down, you know, to your local health food store or maybe go to, you know, line or whatever, and just buy the precursors and start taking it.

And then you have gene affinity. We can tell you all the ins and outs of how to do that. And then okay, so what else is out there? Of course you have the promise of analytics out there.

You do, drugs that will kill off senescent cells. That's kind of a choppy water at the moment. You know, that there was a failed clinical trial, probably because they set their standards too high, and chose the wrong model.

But, you know, the concept of it is very sound can probably help. One of the things we found, though, actually another lab found, is that if you have a good immune system, it clears up, it clears out the senescent cells.

Just so you might not even know. Yeah. Yeah. Well, so what else is out there? So one thing that's captivated me is a couple of studies that were published in nature by Dong Chang Dong Chiang Kai and Albert Einstein University Medical School, and what they were looking at is aging as a program phenomenon that starts in the hypothalamus.

And what they found is that there are neural stem cells in basal forebrain lining the third ventricle in the brain that shed factors into the cerebral ventricles, which eventually get into the rest of the body.

And they control the aging of the body. And the reason that we age according to that, the line of attack is that there's an inflammatory process that sets in the damages, those neural stem cells.

But if they replace the neural stem cells or block the inflammation, then you can reverse the peripheral aging changes. So it's very exciting. And there's a guy named Sheldon Jordan.

He's practicing medicine in Santa Monica right now. He's trying to use ultrasound to drive exosomes into the people of thalamus to try to reverse that effect.

So amazing. And that's amazing. Yeah, there are some really interesting things happening with the regenerative growth factors, you know, and and utilizing those in a intranasal delivery system around and, and even pairing them with some peptides at some of the neuroinflammation.

And it's interesting, I just spoke with another practitioner the other day and they were speaking about. And there's more and more research coming out about molecular hydrogen and the impact it can have on neural inflammation.

So yeah, there's there's a lot that's that's actually that's a I'm going to look those studies up that, that I mean think about it right. When our brains are less inflamed and we can think clearer, think better and just.

And again if it's going to slow down the I like the, the way that it's helping to signal kind of those that aging mechanism. That's really fascinating.

That is some exciting stuff. And so here's I mean, this is what makes this field so fascinating. And and what I want to point out. And we'll wrap up here in just a few minutes.

Everybody, thank you for listening. But I know you're enjoying this as much as I am is I love the point that you brought up around the study around senescence.

And cellular senescence is such an interesting rub because yes, we go into a place that we have too much and it does create greater imbalance in the system.

And yet it's also a natural phenomena that we need in the body. So it is there for a reason, for a purpose. And I think we always start with the best intentions in medicine, right?

Like the best, best intentions. And then somewhere along the lines, we forget the body has this amazing innate intelligence and there is always a reason that things happen.

And maybe instead of trying to get way, way, way down the rabbit hole into a very specific pathway, if we go a little macro and we look at the system and we look at the dynamics, we might be able to see the forest through the trees and and understand it doesn't have to be all these little siloed mechanisms, but there can be some larger, you know, not knobs that we can turn, so to speak.

Keeping it very simple, that can really make these profound changes while still honoring that innate intelligence. And I know there's some really interesting work on senescence about resetting it.

So instead of getting rid of it, resetting it back to to its present essence day into its normal functioning state. So there are some interesting ways that stuff's being looked at, and it's even your work.

I like what you're saying about when and and what you guys it to a point. We used to think, okay, antioxidants. And now we're realizing, wait, when we're depleted in this oxidation effect again there's a counterbalance right?

There's always a and also not an either or happening in the body. So it's kind of fascinating. Yeah it's true. Everything is there for a reason. So you have to be a little bit cautious.

We're talking about kind of fine tuning the body rather than hitting it with a club right. Yeah, yeah. And I think that's

what's beautiful about your work.

You're really looking to say how does how does this work in its most natural, optimal functional state. And I believe that's why your study has been so successful.

It's why you're going to continue on is you're not looking to start or stop something. You're just saying, how do we rejuvenate, how do we bring this back?

Promising longevity therapies and personal stack

And then what happens when we do. Right. And so again, I really I really applaud your work and I'm excited for the things that are coming. I know with great minds like yours out in the field, it's only going to get more exciting as we go.

So, you know, thank you for sharing all of it. And my very last question to you, sir, give us your own personal longevity stack. So obviously you were you were patient zero.

So you were another one on your own protocol. And in between those rejuvenation bouts, what do you do kind of on a daily basis to keep yourself thriving?

Well, I do all kinds of things, so I make sure I'm replete with magnesium, for example, we tend to become depleted with magnesium, and you need magnesium for like 400 different enzymatic reactions and for making ATP, which is this back to the energy thing again.

I do take vitamin D that seems to have anti-aging effects, is also a cancer chemo preventative agent. But you also have to take vitamin K2 along with that to make sure that the calcium that you absorb due to the vitamin D, goes into the right places, not into your arteries, but, you know, into your bones and things like that.

I have kind of an anti-inflammatory panel that I take, which includes things like turmeric and the lycopene. Lycopene is anti-cancer agent as well. I also take coenzyme Q10.

I take 200mg of coenzyme Q10 every day. Great. My anti-aging panel. If you look at what happens to old rats, the coenzyme Q10 levels are flat with age and everything except the heart, and it's like 20 months.

It just falls off a cliff in the heart. So you need to have your coenzyme Q10 level maintained. So I do that. I actually am responsible for introducing coenzyme Q10 in the United States as a as a health supplement.

I wrote an article about it in what is now launch Out of Life Extension magazine, but it used to be called anti-aging. Anti-aging news, I think. Anyway, so I like coenzyme Q10.

I also take central flaxseed. I'm not sure if your viewers are familiar with that, but, I've been interested in central balancing for decades. Central flaxseed dissolves accumulated junk in cells.

So as we get older, or at least if we're certain species like rats, I'm given to understand that up to 70% of the volume of a cardiac cell in cardiomyocytes can be filled up with junk things that should be degraded by the lysosomes that aren't, and they just accumulate in the cell.

Same thing with brain cells. You tend to accumulate this stuff. It's called depending upon who is pronouncing it or perfusion or foreskin. And a center for dissolves that it gets rid of it.

You actually have normal mechanisms in your cells to dispose of this stuff, but they slow down with aging and somehow central brain arcsine recharges them, and it allows you to dispose of these things.

The Sense Foundation was devoting infinite amount of resources to trying to get rid of first. And by using enzymes that they were getting out of microbes that digest bodies and graves, because obviously they must have the secret

of getting rid of all of us.

Getting rid of you said, but you don't need that. You just take central flaxseed and you're fine. And I also like to take NAD precursors nicotinamide right beside or in a man.

Those are good. I also take a sledge clean. I've taken sledge clean ever since. Jonah Hill showed that it can radically extend the lifespan of rats in 1988.

It also was discovered later to extend the lifespan of hamsters and mice and even dogs. So that seems like a good thing to to take as well. Yeah. And then what else?

There's a few other things I take, omega three fatty acids from life extension. Those are very good for you in a number of different ways. Yeah. And there's undoubtedly a few other things.

Sometimes I take selenium. Selenium is thought by some to have an anti-cancer effect. Some think it has a pro cancer effect. I think it has probably an anti-cancer effect.

If you don't overdo it. I also take zinc every day. I take about 50mg of zinc, which is kind of a high dose, but you need zinc for those thymic peptides that we were talking about.

Yeah. What one of them is called formula. And if you don't have enough zinc it's inactive. So I make sure I have plenty of zinc. But if you're going to take zinc, you might want to take copper every once in a while because if you don't, you become imbalanced for copper and your copper zinc superoxide dismutase might not work as well.

So, you know, there's a variety of things like that. I'm sure I'm not remembering everything, but that's pretty good. Oh, one of the thing I do take is life extension mix.

So I work with Life Extension Foundation for many, many years. And I used to go I used to go to scientific meetings on aging, and I would report to them what had been learned, like for example, choline, dietary choline, the right kind of lecithin can reverse brain aging changes.

The synapses, you know, that look kind of like lollipops. And as you get older, they kind of flatten out. So the guy who was talking about the Mervis called them lollies and nubs, and he said, as you get older, you switch from lollies to not these.

But if you take central fanatics at central lecithin, you can reverse that process or prevent it. So they incorporated that into life extension, mix and everything else.

Freeze dried cabbage got in there because it reverses sulfide role oxidation. And so so they put everything in the kitchen sink in there. And I've been to their quality assurance plant and long ago that is this huge warehouse.

And they do everything, tests all the products and make sure that what you buy is what they say is in the pill. So so I bought that. I take only nine of those a day because there's evidence that you can overdo that.

But anyway, so I do a lot of stuff. You know, I think all this is good. I think that life extensions needs to make your own proprietary stack, and this would be the face stack, a lot of that doing that.

But a lot of people ask me this question. This is actually the first time I've ever gone through all of this. Yeah. Place like like this. But I did reveal one other thing I didn't mention, which is harnessing the so in a test tube or let's say in a culture dish, we're talking about senescence cells, right?

You let the cells divide a certain amount of time. They hit this Hayflick limit, they become these grotesque monsters, and they start producing, suspend all that stuff.

But if you put carnitine into the culture medium, they go back to normal. They so I for that and I haven't become

weaker with age. And I think maybe one reason for that is that if these things have a similar effect on satellite cells, in other words, muscle stem cells, it may allow your muscles to maintain their functionality into old age.

So that's speculative. But something's working. So maybe that's it. I don't know, so many fun things. Okay, seriously, we need to talk to that. Listen, here at Rad CAS, we are dear friends with the life Extension Group.

And every year, of course, they'll be participating with us at our ten year Rad Fest amazing celebration. It's going to be a couple of incredible days out in Las Vegas.

You're going to get to meet, incredible humans just like Doctor Fahy. You will be with some of the top minds, top thinkers, and it's going to be a very immersive experience.

Life extensions will be there. We are always so proud to have them as one of our main sponsors, and this year will be no different, but I think I need to lobby for the Fahy blend.

I mean, I think that's what we need because I will tell you, I want to personally, I'm going to listen back to this because I'm like, okay, the central and the central pinnacle, right?

I don't know that ingredient. I want to know that ingredient. I want to see some research on it. And I want to obviously, they probably have it at Life Extension.

So you've brought some things to light today that they are new. Thank you. We are certain things that aren't spoken about enough and and truly harnessing, you know, choline. Those are it's so simple.

Like we can get those very easily and ingest those in. And there's a let us not forget everybody. There's fundamentally there are key macro and micro essential nutrients that we need at every age and every stage throughout life so that our cells can do what they were designed to do.

And of course, the more demands we put on the system, the more support we might need along the way, which is why we want to get into the next trim X trial and see about rejuvenating that via.

And everything else too. It seems like everything else gets rejuvenated to. One of the things I didn't mention is that our people also get stronger. And, you know, everything that we measure seems to be going in the right direction.

So it's it's it's it's pretty encouraging. That's what it's all about. So it is hopeful. It's exciting. You know, as we chronologically move through this beautiful adventure of life, remember, aging is optional.

It's not about breaking down, becoming dysfunctional or getting diseased or even living with. There's so much those within our capacity and our ability to simply, as you're learning, like you are here, participating in this show, coming to Rad Fest, you know, opening your mind, opening your heart, and just being willing to not take the old story as your story.

You are the master of your destiny. Learn, apply, integrate and love your life because it is such a gift worth living. Doctor Greg Fahy where do you want everybody to find out about you?

Well, I would actually like you to contact somebody else, but she's okay. Okay. Yeah. So her name is Grace. And if you write to Grace at intervene immune.com, then you go straight to the person who will process you when you come in.

If you write to me, I'll just refer you to grace. So Grace is our gal Friday. She's she will take care of you and tell you everything you need to know about how our trials work and what it takes to get into them.

Absolutely amazing. We'll make sure that Grace's information, which she might be a little upset with us, but we'll make sure that her information a direct link to the site where you can find out anything that you need to about the upcoming studies, will be here in the show notes below, we'll make sure to have some links to Doctor Fahey's

favorite molecules over at Life Extensions and all the other goodies that we discussed today.

So Doctor Fahy again, thank you. It's been a true honor and pleasure having you here on the show with us today. Thank you Melissa, it's been a true pleasure.

You're the air. You're out there doing the right thing, and I really appreciate the chance to interact with you. Thank you so much. My heart is full. What a great way to end my day.

I am just overflowing with goodness. So to everybody listening, remember. Thank you. You all make this possible. Please like, share, comment below this episode.

Tell us what was your favorite take away today? Share this out with others. Subscribe to the show. Because you know we need to grow this message. We need to share this out with so many around the world.

So there can be a ripple effect because all of us want to live better today for longer, healthier tomorrows. So until next time, be bold, stay curious, and continue to express your greatest states of aliveness.

I'm Doctor Melissa. Take care. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health.

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