The Science Behind Aging and Telomeres Transcript

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Introduction and Speaker Background

Hello, I'm Doctor Sanjeev Goyal, and you're listening to the advanced Anti-Aging and Technology Summit. And today you're going to be listening to Doctor Hakan Kangal.

Doctor icon Kangal is executive general director of medical genetics services provided in Medicare hospitals. He is also a medical director specializing in both clinical biochemistry and medical genetics.

After obtaining his medical degree, he completed a PhD in clinical biochemistry and then did a second PhD in a field of medical genetics at New York University, where he primarily specialize in cancer genetics.

He performed his postdoctoral studies in University of Birmingham, UK in the areas of Malik in Medical and Molecular Genetics and Personalized Medicine, where he gained that academic degree of Senior lecturer.

Having many scientific awards and a worldwide patent. Doctor Kangal became a full professor in 2014 and worked as a faculty member. He's also department chair and head of internal medicine services in several universities in Turkey and abroad.

Currently, apart from his job in medical hospitals, he maintains the post of Academic Head of the Department of Medical Genetics and Bruny University Medical School in Istanbul, and honorary member of Academic staff in the Department of Medical Genetics and Personalized Medicine at the University of Birmingham School of Medicine, UK.

I hope you enjoyed today's talk with Doctor Kengo. Hi everyone! I'm Doctor Sanjeev Goyal and you're listening to the advanced Anti-Aging and Technology Summit.

And today I have Doctor John Gall. Haakon John Gold, who's with me from Istanbul. All the way from from across the Atlantic. Who's going to be talking to us about, telomeres and aging?

Welcome, Haakon. How are you? Thank you very much. I'm good. Thank you. How are you? Good. Thank you so much for taking the time. I know it's evening there.

I know you have a presentation, so, why don't you just go ahead and just start the screen share, and we can we can go through that. Okay. Take your sunshade.

I will start, with my background, a little bit, and then, we can, go on with your questions. A little bit of my background. I'm a medical doctor who specialized in, two areas of, medicine.

One is, clinical biochemistry, and the second is, medical genetics. And I did my, genetics Ph. D., in New York University, USA. And I got, my, academic degree of senior lecturer in, the Birmingham University, UK.

And then I got back to my home country, Turkey, after 15 years abroad and, but still keeping, my position, at the University of Birmingham. Actually, my, son is still there, going back and forth, frequently.

So, in genetics, after the Human Genome Project, as you might remember, in 2001, professor Dan Clayton, first time, released the, the genetic code of, human beings, but it was, more like, just, unknown, meaning of a book.

I would say, I will tell you about Human genome, what they did there. They did the, sequencing the entire human genome.

Human Genome Project and Disease Gene Discovery

But at the time, it was not known what, but this information matched, then, studies started on that information in terms of what genes do in human body, human physiology.

And I was involved in several studies. We called it gene hunting, which is discovering the disease genes, because if you discover a gene which is mutated patients, responsible for a certain disease, then you can understand what that gene does in the body.

And, that function, fails, what goes wrong in the body? So these are the lists of, genes that we discover, with our friends and teams. And, we published them, in nature at the time, it was much easier to publish in nature.

So when you discover a disease gene, and if you can show, certain evidence, you are able to, to publish it in nature, in the next, there are a lot of, technical details about it, but we were able to discover several disease genes through, which case, you can identify and recognize that all the, patients, on Earth suffering from those diseases, these are usually diseases of, childhood.

And, many of them are, quite disturbing neurological diseases. Once you are able to identify the genetic codes, then today, you are able to, treat them, which was not possible in the past.

So, to do this, you know, you need to get funding in the academy. And these are the lists of funding, in the in Europe and, in America to do, these studies and lot from my, academic work.

I was always involved in the clinical side of genetics, which is the genetic diagnosis starting from, 98. I, this year, completed my 23rd year in, genetic diagnosis.

I worked in, several, diagnostic, centers in America. The UK and Turkey, in Turkey, I found that, charge, genetic diagnostic lab, recently, so. Well, when we cut to the chase, people are getting older and older, with the not only genetics, but, several other resources and, technological advances, but, usually, after 60 years of age or in developed world, after 80 years of age, people are, getting more and more sick.

So, this, puts a burden on, economic resources as well. So, when we are able to, identify the mechanisms in, aging and health at the molecular level, we can do something about it.

So, that are come to, for p medicine we call today, perhaps Sanjeev, you know about this? I will go into detail. I don't it's a little bit far about, for p means, this is, high resolution medicine.

I would say using all the tools, technological tools to recognize disease better and treat them better. If you can recognize better, you can treat it better.

So, today, maybe you saw, this diagram before, in the past, especially, in the developing world, you can see the, red diagram here. Usually after 60 years of age, health profile, goes, steep down.

And today, with the, available technology, not only it's possible to extend, that lifespan, over a hundred years of age, but also healthy aging with the performance of, 40, 50, or 60 years, of age, you can maintain your life longer and healthier and in the horizon, of the science it is predicted.

Now, it will be possible to, to see, 200 years, it was on the cover of time magazine. Babies of today born today are likely to live hundred and 40, 150 years, in that, healthy estate.

So biological age is different than the calendar age, as you know, in biology or medicine, it's not, mathematics. I mean, two, plus two always, never, for in medicine, or biology.

So in terms of aging, you see a person who says, he's, 40, but he, he looks 50 or 60 and opposite. It's possible some people surprise you when they, say their age.

So, because the biological, age is different than the calendar. Calendar is on one side.

Telomeres, Cellular Aging, and the Hayflick Limit

But I hope, our biological aging process is a different, issue. And also, there are differences between people in terms of aging. We are ten different ten tendencies in terms of diseases, risk of diseases and aging as well.

I will go into detail about that. So, aging process, is closely related to telomeres. This is a genetic material. At the end of our chromosomes, which protect, our, genetic material from degradation.

There's a nice, analogy here. If we can, we can resemble them, to the, shoelaces. You know, there are plastic caps to protect the shoelaces and in time, and you use your shoes, usually they get degraded. And, also shoelaces start to, get to the degraded without, that protection.

Telomeres are similar, actually, this is a human chromosome, and you can see the yellow weeks at the end. And these are telomeres protecting the chromosome.

And the information in the DNA. But, Houston, we got a problem about telomeres because, every time cell device, DNA needs to replicate, to give the equal amount of DNA to the alter cells.

So in each cell division and each DNA replication, this telomere, bits are getting shorter. And there is a genetic explanation, about this, but I will not go into detail.

But, I will just tell this replication mechanism, and the enzyme cannot replicate the very end of telomeres. It can replicate, the rest of the telomere, but not the varia.

So in at each, cell division, telomeres get, shorten. And this is directly to related to, biological aging. I will explain it. Quick question there. Yeah.

So it does the amount of shortening, that happens with each cell division. Is that the same for everybody or is that somewhat genetically determined? Every time it is same, but the rate is different, between the people, the, the length is the same.

I will go into, quite technical detail about it, actually. How this enzyme works, why that happens. And I'm sure, you will understand it better. I think at this stage it would be better, if I showed you, in the later, slides.

That will be, much more clear. Okay. Yeah. For now, I can tell this is directly related to aging of our cells, aging of our organs, and aging of our entire organisms.

How? Central this is I will show you, with the, research and the papers. Very impressed features, papers. I will show you, if I, summarize the, functional telomeres.

These are important for genomic integrity because these bits are, not holding DNA. You know, normal DNA parts. They called for proteins, which do the functions and all the functions in our body.

By the way, Sanjiv, I should tell you, at any moment in our bodies, each cell has 10,000, proteins. On working, you might think of this. 10,000 workers working in a factory without interrupting, each other's work.

This is. This is quite something. We still don't understand how this is maintained in the in one cell, and we have about 100 trillion cells in our bodies.

I will get back to that. The second point is, this chromosomes can fusion. Actually, we have 92 chromosomes. And if there is no protection, they can fuze with each other.

And that that would, disrupt some functions, for cellular replication. Well, I mentioned this particular, this this was the, one of the latest, presentations I did, because of Covid, actually called telomeres are important in, Covid infection because, telomeres are important for immune cells functioning as well.

I can talk about it if you like it. And, we call, cellular senescence after, certain cell division cells cannot, replicate and dividing and going to stay off, senescence.

This is very important for aging process. Also telomeres, protect DNA from mutations, which is directly related to cancer. Cancer, we say, is a genetic disease.

That doesn't mean it comes from your family. But in cancer, definitely there is, damage to DNA in your body. And there are limitations in DNA posing the cancer.

So, getting, to your question a little bit, how much, shortens, with time and cell division? In the right hand side, you can see the telomere repeats.

These are repeats of DNA sequences. And as you see, when it comes down to certain length, in the bottom, you can see how short the telomeres there, cells going to senescence, because at that point, DNA is all the rest to get damaged because protection is, disappearing.

So cells have a mechanism to sense this and then stop dividing because if, it keeps growing, dividing, cancer might trigger because the DNA will be damaged.

So, when there is a threat to the code, cell division halts. And this guy, we need to remember, Lenart, Hayflick discovered this. How many times can, a cell divide?

And he, points to a certain number after six to doublings cell, can no longer divide because of this mechanism. But at the time, he didn't know why this happening.

But he measured how many times it, divide it and in no cell culture dish. And he found this number. That means that everybody. Yeah. Every cell can only divide 60 times, and.

Yeah. And then it's going to stop dividing no longer by only cancer cells divide more than that. They figured out a way to get around this. Yeah, yeah.

Get away. Get away from that mechanism. Very well. Sanjeev. That's the smartness of, cancer cells. And I guess one other way. I would think if we were trying to, prevent to reach this limit would be to just, slow down.

The rate of doubling like that would be, I would think, absolutely slowing down, slowing down the clock. You. Right. This is like, this works like a molecular clock.

I'm talking about molecular clock. Biological clock, which is that different than the, calendar from clock or watch clock? If you rank. So, telomeres shortened by age in all tissues because in each tissue and each cell in our bodies, we have chromosomes, we have telomeres.

So the longest telomeres are as you might expect in the fetus because it's still dividing. Right. The cells. And then at the beginning they have the longest telomeres.

And the longest telomeres are in the sperm. Which is not a surprise because in every relationship we, they, we get like 300 million, sperms, right? Think of the division, right?

And if they didn't have the long telomeres, they would stop dividing. So we wouldn't, get enough sperms.

Telomerase and Reversing Aging in Animal Studies

So we start life, about 20,000 nucleotides, length of, telomeres, which means, in the medical school, you might remember, we have this, a TCG letters, about the DNA codes, which are the nucleotides in each unit of DNA.

So those are the four letters. So, of those four letters, we have 20,000 of them. In the beginning of to life. But at the

end of life, they get shortened.

And, we are talking about telomeres, like 4000 letters, which is five fold, shortening. So, these people, great contributors, on telomere science, and, very well deserved.

They got Nobel Prize in 2009 with their work on telomeres. And, telomerase enzyme. Quite relevantly, we came to, talk about this enzyme, telomerase. You know, science never stops.

And then they invented telomeres, and they, you highlighted this enzyme. As you know, again, there is never one way in biology and, medicine, if there is shortening, there is a mechanism to extend it in our body's counter mechanism, which is done by this enzyme, telomerase.

If you remember, I mentioned, each cell division, telomeres shorten, but this enzyme only can counteract that. But, I will again, mention about it in adult tissues, the activity of this enzyme, turns off in the fetal tissues.

The activity of enzyme is high because cells need to divide. When you get to the adult tissue, you don't need to, more cell division. And then activity, of the enzyme is reduced.

This is, again, another pump, complex genetic mechanism of how the genes are turned on and off. I'm not gonna go into detail, about this, but, shortly, I can tell you in, every gene, there are activators and incubate inhibitors, for the need of the cell and inhibitors, counter.

I said, if you don't need that function anymore, if you need that function, you've got activators which turn on the genes. Telomerase. Is it stabilizes the telomeres or lengthens the telomeres to.

Yeah. It it, here you see the end of telomere sequence. Actually those, detail types I mention the, beauty and the function of this gene has a template for that end of chromosome because, normally it cannot, replicate this enzyme.

There is, no template to replicate the end of the person. But this enzyme has a subunit which provides a template to extend the very end of telomeres.

This is what it does. And this is, like a molecular motor, that extend the ends of telomeres. And those people, who discovered this enzyme, it was not long before telomeres, started from Hayflick from 60s, but telomerase enzyme recognized, first line by this people.

That was, new era after that because it opened up, a lot of new opportunities. So this, reverse transcriptase, the Hulk and hurt are these these are components of the telomerase.

And so. That's right. Last transcriptase uses RNA template. That's why it's, reverse. It's called it is able to, synthesize DNA from, RNA template, kind of, and because it's an enzyme, it's called reverse transcriptase.

And one of the, advances after this, you know, they had selected element 60 times, and you can translate to the human life or any, living organism has a maximum, maximum lifespan, right?

Ours is like 120, 25 years. You know, people in, Himalayas or, Japan, some people live up to that age, but it was known that that's that's the maximum, human being, can live.

It changed now because there is no limit. Actually, you can expand it. So Hayflick limit is, was true at the time. But if you don't, if you don't do any, interaction, but we know that, 60, is now the limit.

So 100 and 20 is not that limit. For a lifetime. Let me get back to this. This is, groundbreaking, study published in nature, 2011. In one study, they showed it is possible biologically to take this high forward and take it back, reverse on a mice.

Let me, show you, the mice here, the top one, is, genetically modified. And only one mechanism, telomerase

enzyme is turned off. And normally a mouse lives like three, four years.

And when you turned off the telomerase, this mom, at the age of six months, looked like 3 or 4 years of age and showed all the signs of aging. The, the hair got gray, immune system, reduced activity atrophy, cancer incidence in this strain is higher.

But the smartness of this study, they did it temporarily turning off the telomerase in the same strain. They were able to reactivate telomerase and then make the mouse younger again.

Just by, extending their telomeres. Just one mechanism in biology, you know, there are several mechanisms. In one process, I show this slide, to, explain how telomeres are central in the aging process.

And, we dial it out. They, they were able to show this, nature published this study and it opened a new era in terms of anti-aging, genetics, telomeres and that.

I will go on after this. Any questions? So, no, that's very that's very exciting. I mean, I have a question about I mean, this looks like a study where they deactivate the telomerase and then reactivated it to back to physiological normal level.

So but I'm curious now, I think you're going to be talking about super, normal telomerase, if that's possible. Can we can we change that telomerase to what's.

Yeah, that that's what we're going to talk about then this is what to 65 is all about. Actually that's what it does. But this this study is very important.

Lifestyle, Diet, and Supplement Strategies for Telomeres

I can show you, some new, the papers, got all the papers and this is very well proven, and nothing against it. So far, groundbreaking. Groundbreaking. Absolutely.

And this is like, turning off the time and, putting it back. Back? I mean, that's crazy. I, I if somebody told me this ten years ago, I wouldn't believe it.

This is, when the telomerase gene is active, every gene has, regulatory, cyclic called promoter. And in our, reproductive cells, as I told you, sperms, this promoter is active.

That's why, telomerase gene works and produce telomerase enzyme. But when we get older, it's repressed, by our repressed cell so that, it slows down the activation of the gene.

Yeah. So, there are several factors. As I told you, in biology, there are parole mechanisms and time mechanisms in terms of, telomere length, like, proliferative activity, oxidative stress, inflammation.

They don't, caused by infections, tissue injury, toxins, stress, they all, have an effect on this. And, if you have telomerase, on the other side of the, balance and which you can modify this with your lifestyle, that, stress reduction supplements, today, which, we're going to talk about.

So, there are, the, the genetic and environmental factors which we, which we are not, have always, an effect on them. But there are lifestyle factors which can modify and, we can do something good for our telomeres. So, if you talk about what happens, telomeres short and why why do we care, about this in terms of that that that's the laboratory.

But, we can't into real life now what happens to people's life? So short telomeres are involved in all diseases because, it's related to cells function.

And it's one of the root causes of every disease. I will, tally, in a minute. And, if you don't know this mechanism,

actually, you are, short of, every short of treating every disease because telomeres are in every cell's telomeres are shortening in every cells and organs in our body.

And if you don't do something about this, you might be missing something. You not doing something good in somewhere. But if you are missing this, you might be missing, the, health effect you can get.

So New England Journal of Medicine, approach this, issue again, 2009 2000. The, telomeres are always, involved in, especially diseases, of late onset later in life.

This is, going to call it, if you, I might, roll past quickly here, showing the why important this is about. It means to actually, so, if you allow me, I will just go past and, Okay, I will get back to this.

What? We can do, two long enough. Telomeres. Because, if you, if you, discover a mechanism. So, there is, the, there is, mechanism we call, awareness or, mindfulness, they call it now.

So if you, if you know that, there are telomeres in your body and these are doing something and, when the function is, going down, you might like to do something about it.

This, awareness is important. That's what we are trying to, arise in people, if you may, during this talks and, our scientific work as well. So lifestyle I mentioned stress is a real factor, in terms of, telomere attrition and telomere damage, exercise is shown to be, have a root effect, on telomeres, weight loss, and low calorie diet.

We definitely know, reduces, challenger the damage viral infection and smoking, like, in everything diet. Omega three is important for telomeres, which is, common supplements nowadays.

I don't know the situation in Canada or America. Are people using, omega? Yeah. It's definitely recommended. Yeah. To most patients to take. Yeah, yeah.

It's important for, silent inflammation. You know, the reducing the silent inflammation, which is important in, pathogenesis of, every diseases and later on onset diseases also, in terms of telomeres as, it has a good effect.

Can I ask you a question on, I know just before we get to supplements. So exercise, if you could tell us that. I mean, I would think that potentially too much exercise could potentially increase telomere shortening.

That's right. That's what a study looking at. That's very good point. Telomere science tells you, excessive exercise is not good for you because it increases, reactive oxygen species, which are very, damaging to DNA.

And telomeres. Right. So monitor them. So this, you mentioned weight loss and low fat intake. I know we've had a couple speakers talk about keto ketogenic diet, fasting.

So what's the exact mechanism of the diet? On the teemo calorie? Again, the same mechanism, reducing the, reactive oxygen species. The more calories you get, your mitochondria, will be, working like crazy.

And they will, they will release, cytotoxic, metabolites, which, which will, damage your, telomeres. So the low fat intake is more about low calorie. Is it like.

I mean, can one have I not know I'm not dietician, but, in terms of, diet, I should tell you there is no, magical, magical diet, for example, in Turkey is ketogenic diet is very popular.

Now everybody's using the Johnny diet. It doesn't work in every people, in, the same way because people are different and there are genetics of metabolism.

So we got neutral genetic tests which diet? Couldn't be, more suited to your genes. This is like, it was popular Atkins diet pop protein diet. We we got tons of diet, but it doesn't work.

If it worked, people didn't eat too good because this is like, one side switch and trying to put on, every people. So it doesn't work. But genetics, neutral genetics, provides the information personalized.

That's the one P of £0.04, actually personalized, regimes or diets are important for you. And we are doing neutral genetic tests. Which diet, would be more suited to your genes, to your metabolism.

And you can wear it like, a custom made, saying that, it is proven, four times effective if you, if you use neutral genetic tests, before going into a particular diet.

Okay. Thank you. That's great. Supplements, I will say, vitamin B is, even though we are a very sunny country, because of, enzyme polymorphism, we use, like, D here.

I don't know, what's the situation. It's important for, immunity as well. In, in disease, in war, one can indeed is very, very popular. And, I think it's more p hormones if you have, hormone replacement therapy for, menopause moment.

The woman, I can't tell the rates are, much better. And, they can also, prescribe tr tr metabolism. Now, even it's possible, to order, the best, switching hormone resp.

Replacement for yourself. And we come to the to 65 here. That's the, specify. I'm going to tell you what this is about. This is, plant actually plant extract, which is used in Chinese medicine more than 2000 years now.

And, it's called astragalus membranous cells. And, it's used for healing, in the Chinese medicine. But today we, we know how it works on, telomeres and the active, active molecule is cyclosporine.

It's called and it activates the telomerase gene, actually. And, the extract now you can measure, in units because if you, try to consume the, the plant, you need to, eight tonnes, tons of them.

And when they extract in a correct and protected mechanism in a capsule, you can also, measure the unit of, activity, and, you can use it properly. So how it works?

As I told you, in adult tissues, the gene is turned off, by a repressor, which binds to, promoter gene regulatory elements of DNA. But, anti-aging, product is binding to that, repressor to, protecting its, repressor effect.

So it neutralizes if you make, in that sense, it is the first commercially available and, which we have, the most, data about it, clinical data and laboratory data, trying to see it, this, transiently activate telomeres, which, I will talk about in a, in a, bit because telomerase, most people will ask you this question, actually, we can talk about it because in cancer cells, telomerase is activated as well.

This is the way, as we talked before, cancer, cells avoiding this stopped the winding, issue. They activate telephone areas, but the activation in cancer, which is much more altitude.

It's like endless activation, continuous activation. And that's the only mechanism, to turn, a cell into a cancer cell. There are other mechanisms. And, I'm going to talk about why, to 6 to 5 doesn't cause cancer in a it, okay.

This is, regulatory stuff, for food supplements. You you need to get the certification, if safe. And it was done in America. This is again, the effect of to 65, on immune cells on the why?

It's good for, Covid infections as well. I will, will pass, quickly. Okay. How, effective, is to 65. And what happens if we didn't take, any supplements or if we didn't do any, good things about telomeres, like other, other, life changing, modifications.

On the left hand side, you see the to 65 and the right hand side placebo group. And they used, treatments six months, nine months and 12 months. And they measure the telomeres, average telomere length in people.

And if you didn't take any, supplements or if you do, change to your lifestyle, you know, in one year you will lose, about, 300 base, from your telomeres, and then you use two to 6 to 5, you gain 500.

So there is, almost, 800. Base, difference, in terms of telomeres, about that. Yeah. I have a quick question. So, yeah, I guess, maybe this slide addresses it, but over a long term, what do one just expect to continuously increase these base pairs every year?

TO-65, Clinical Results, and Telomere Testing

This slide is all about that. Thank you. Very well located. And time to our question. And usually we use a few years and then we check it, with the telomere measurements.

How useful. Because, people have different metabolism. They metabolize three to 6 to 5 in different phases. Well, we don't get the same effect in other people.

So we go, with telomere measurements. How beneficial? In what those, how many years we need to use, we can estimate there is no, you know, ready to use formulation because still, this is in use, but we are, able to use it, in safe limits.

And here is, patient, actual patient. When, she started using to 65, I think she was 62 years old, and, she used 500 units daily and, wonder biological age, by the way, which is in the, blue Dacron, which was already good to, to her.

Helander age, she was lucky in terms of telomere length. Still, it was effective on her, at least, it, stabilized. The the shortening, in this lady in five years at the end, if you if you see telomere length, she didn't she didn't lose it.

If, after five years, she got to, 7 to 7 years old. Thank you. Oh, sorry. 6 or 7 years old, but, her telomere, length biological age was still under 50.

And she was, feeling this energetically immune system all parametres. This is the male version of similar, results for four years, of usage. 500 subjects here.

And, especially again for, effect on, immune system. They, they used four different regimens, in the study. They compared it to, placebo. And, those effects, was, able to be, established by this study.

They used several biomarkers, to show the effect. And, it was, published in Journal of immunology in 2000 age. So, it showed I'm not going to go into detail, but, at cellular level, they showed, it improves, the, immune profile because immune cells going to senescence by age, you know, our immune profile is declining.

That's why we see cancer, in, older people, more frequently, because, body's not able to, defend itself, against cancer as well. White blood cell, immune cell, function have improved.

Show, they showed, again, these are parameters of, cytotoxic cells, natural killer cells. All parameters are there. And, the the conclusion of the paper, that in terms of immunity, people got a more youthful profile in terms of, immune profile.

These are, again, the same, the as I said, these are, too much detail. Okay. Studies are, more than 12 years, on to 6 to 5. The first is started in 90s, in a in a, biotech company, down in California.

Then the, the, license got, to this to sciences, in, in New York. And they produced it commercially. And it's, used, by people in America, since 2007.

More than 10,000 people are currently using, and there is no side effect or, any higher cancer incidence. Nothing. It's it is safe. It doesn't harm it.

But people get, different, benefits from it, which we can check, by the telomere measurements. If, if you're not

getting enough benefit, you don't need to because there is a cost.

You don't need to take it. You you need to do other, life modifying. Let me get into this life changing, you know, how t recommendations are given to old people.

More more exercise, less alcohol, no smoking, you know, and low calorie, no pi board race, all that or, regularly, lifestyle enough sleep and old, less, stress.

But it's not possible for every people to do all those same to my, clients. The supplements are there for the things that you cannot do, but that supplement doesn't work for you.

You need to do something, even change your, job if you need to. If it's so stressful. So, we need to do something to 6 to 5 is not only. But it's helping to us for the people.

For example, I am Caroline. Like, she's, she's, tablet, magazine, person. She needs to go into parties late at night. How can I tell her I'm going to sleep?

She she can up to her job. So I'm telling to her to, everything else. You cannot change this. You know, you cannot get enough sleep, but you got supplements, to help you that that doesn't need to put into, people into, relaxation.

But we need to, give people hope as well, especially in Turkey. You know, people are more careful about this in the rest. I'm sure in Canada, I know England, I know, New York.

But in Turkey, people are much more relaxed about, lifestyle, issues. They're they are getting more, mindful about that, as well. A couple of questions.

Okay. Do you have a. Yeah. I want to make sure you talk, actually. Yeah. I have a couple of questions before the end. So one is the, so if somebody is, like, doing it, like, you know, doing very well, like exercising and, like, would 65 still have added benefits because in this case it looks like from the the graph is that basically stopping eating lifestyle changes.

You know, the I showed the effect like 500 extension. You wouldn't get extension with only exercise. You can slow down the losing that but extra because you need telomerase activation for the modifying factors.

You can't slow down the process. But to 65 you can even reverse the process. So people are noticing. Are they noticing physical signs of improvement? By taking the supplement like improved skin, I believe, eyesight or eyesight.

What are your clients noticing that? Definitely. That's one of the, early signs we see. Our clients. Short sightedness, less, about three months if they're going to benefit, about it, depending on their metabolism.

It shows the effect in three months. Always. Right. Almost. Always. From the start. People feel better. Part of that could be a placebo, but it's it's sustainable.

People feel better in terms of energy. They have more energetic. If it works for them, they definitely feel it. It's not placebo. Right. The dosage I see you have is 500.

I guess the study showed that that was kind of the best value for money. I guess one could take up to 50 to 1000. I understand. Again, for the starting point, we need to do the measurement.

How much? Life, brought that particular person in terms of telomere length, which is dependent on, his, her genetics, also environment and two factors, how that environmental effects there are.

So, before starting, I always measure people can use this, you know, you know, that's what most people do. But, for every client of mine, I definitely measure their telomeres and then decide what to do.

The dose, how many daily usage for how long? And I do intermittent testing, to see the effect so that I can show you the person her immune profile is improving and not doing just fine.

And telomere, I'm showing your immune for a while. Was, this virus started, and after that, I have an evidence, to show that it doesn't decline just on the the feelings, of people.

I need to show evidence. Is there, some study? What are the ongoing studies at 65? But there are things that are happening now, like. Yeah, there are studies and, for example, this Covid studies, still going on, particularly for that, infection, how, it affects but it's not easy, to find funding for this type of studies.

But there are several studies ongoing. I'm not involved, but, you know, probably in Canada and, George in New York, they have the latest information about that.

Actually, I'm getting information from that. Okay. Perfect. With regards to testing of telomere, where can, like, which company do you use? And and what?

You know, if somebody wants to get done, there is a company in Spain like flag. That's what we use because it's FDA approved. Still, I believe the only one FDA approved telomere measurements, which could be done everywhere.

It's not, you know, a rocket science, but, the, the knowhow and the information, the information, they because they did it from the very beginning, they have a lot of data to compare people, between chronological, chronological age and biological age.

That's what I'm usually that they have very wide database, in terms of giving you the correct, estimation. There was a groundbreaking study that just came out about telomeres, the Israeli researchers and the use of hyperbaric oxygen chambers, which showed a lengthening of telomeres.

Do you want to comment on that? Like, what's your thoughts about, sorry, Sanjiv. I didn't have, to chance, I know, to study, but, I cannot, give you details about it.

I was not, able to, read it throughout. No problem. Thank you. I think this is great. This is a big help for our for, for our viewers. So just to, I guess, a little reminder that if they, to 65 is the name of the supplement, and telomeres are the, really the mechanism by that's by which aging is happening.

We can say central to our aging process and, a mechanism to get, diseases in that, elderly age. Right? That that would be the message. I would say, thank you so much.

I really appreciate your time today. And and, thank you for inviting Sanjay. Very nice to meet you. All right. Okay. Have a good day. Take care. All the best.