Detecting Cancer Before It Strikes: The Future of AI In Medicine Transcript

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Introduction and guest background

Welcome, everybody, to another episode of the Exponential Longevity Summit. I'm your host, Doctor Jeffrey Gladney. And as you know, we're here discussing how to leverage AI to outlive disease and to live yong for a lifetime.

And it's my privilege and honor to have with me today. A gentleman from India who is on the cutting edge of cancer detection, and also early disease detection.

And they've been using AI in a big way to help them kind of sort through signals in the body to actually understand what somebody may develop and how they may develop it.

So I'd really like to to welcome Ashish Tripathy. He's the CEO of a company called TCR, TCR, TCR labs. And he's the chairman of AI progenitors Biotech.

So with that, Ashish, welcome to the show. Doctor Gladden, it is such a pleasure. I had known you for some time now, and it is always a pleasure to talk to you.

Thank you. Oh. Yeah. Thank you. Yeah. Likewise. Likewise. So bring the audience up to speed. You guys went over there in India? Basically working on cancer detection.

I know there's a personal family story around that as well. I think a relative of yours, maybe your father, ultimately passed away from cancer. And so I think that sort of started you on this road.

Or tell us a little bit about how you got into this, and then where it's gone. So, Doctor Gladden, as as you very well know, that, cancer is actually a weak disease.

So long as you catch it early. You can affect is that we catch it very late. In fact, there's a recent study with the NHS which found that, it was a five year study and was done on ten major types of cancer.

What it found was that if you detect the patient at stage one, the average survival rates after five years was anywhere between 87 to 92%. See that number fell to 65%.

Stage three it went down to 35% stage for only 6% of the people survived for five years. Yeah. There's a separate study that was done in mainland Europe, which looked at the cost of the test.

Why early cancer detection matters

And what they found was the cost of diagnostics and therapeutics for breast cancer and one other type of cancer on an average was about $40,000 for a stage one patient, $400,000 for a stage four patient.

The cost to detecting this disease late. Yeah. Okay. Now, having said this, we claim a couple of, global firsts. This is the first all cancer blood test.

The, you know, for full disclosure, we've tested it on 60 cancers to date, but we have got a US patent, and that's why we have put out a paper in Oxford Academy, a stem cell journal, which was retweeted by Harvard professors.

And it has professors where we have explained why this works on all cancer. Cancer. It's a big deal. That's a big claim, because there are lots of people out there that can look for circulating tumor cells.

And and of course, different cancer markers sort of specific or semi specific to a particular kind of cancer. But what

you're saying is that you've developed a test that can basically diagnose both solid tumors like, you know, lung cancer, breast cancer, things like that, as well as brain cancers as well as hematologic cancers like lymphoma and leukemias.

Right. So this is a big deal because, you're able to actually detect any form of cancer anywhere in the body. All right. And to be honest, because we've already stated our story in the public domain, we made this breakthrough by luck.

We were actually a drug company. We were working on a cancer drug. While studying the pathways, we realized the drug and drug was acting on a small population of Stem cells.

We realized that there's an epigenetic change, a surface change happening on a stem cell that creates a cancer stem cell. The cancer stem creates cancer cells.

Then a billion cancer cells form a tumor, and the tumor sheds CTCs and CTCs break down into the ctDNA. So if we are in every liquid biopsy company you're aware of, but it is grail guardant freedom, all the large ones from Europe and US were essentially looking at these resultant markers of the tumor.

CTC any cell free RNA, they all come after the tumor is formed. Here we are. We had just, you know, we stumbled onto a concept of marker that is showing up in the blood.

A good 12 to 18 months before the tumor even forms. And so these, this, these markers are showing up just so the audience understands, these are showing up on a very particular kind of cell.

Also is it the very small embryonic stem cells is all about right. So epigenetic changes. So basically what he's saying is that the markers on these very small cells, which can be difficult to find and even detect, but the markers change as the genetic expression of these cells changes.

And that that's really the earliest that's really the earliest twist, if you, if you will, that that occurs to actually start you down the cancer pathway.

So you're like going right to the very head of the river, right, right up into the top of the Appalachian Mountains or someplace, and right at the headwaters.

So this is pretty interesting. Yeah. In fact, doctor, this was found by an American scientist. They had found these cells next to the tumor, and they had even hypothesized these cells grow into the tumor cells.

But that has zero diagnostic value. If I can zoom in and see the small cell, I can zoom out and see the tumor. The tumor itself is so small that you don't see it.

Right.

How the all-cancer blood test works

The breakthrough that our scientists realized, because what was known was that it's a pluripotent stem cell. So it exists in every tissue in the body.

That's right. Understood was that it can grow into every tissue and every organ in the body. That's right. Who are scientists realized was that there are specific markers on these cells that don't show up in any other cell in the body, but one, the tumor cell.

And that's you realize that this can also grow into every tumor, in every tissue organ in the body. Thank. Right. But these cells mobilize in the blood because what what what we figured out about these cells are they are like a signal to the body that something is going wrong in my organ.

So the. Theology, impacts a specific organ and enrich these cells. Like, it can actually tell you whether it has switched on towards tumor or not. And okay, to distinguish.

You know, is it is it a scenario where because it's being released that it's in some way activating the immune system to then actually go after these cells?

Or do these cells actually evade the immune system because they're really sort of part of the underlying substrate of the body? How does how does that work exactly?

It's I would argue it's the latter, doctor, but it is a very, I think, point that was made by a very senior professor in Columbia University. What he said was that, you know, we have seen with many cancers, we you know, it's a localized disease, but you will get reactions in terms of, you know, either, you know, rashes or swelling of the joints.

Right, right. It almost like different organs are sensing some something that is actually impacting another organ. And the immune system's being. Yeah.

The immune system's being upregulated in some fashion almost in a non discriminate way is what you're saying. Right. So yeah. So this is fascinating. So then explain to the audience a little bit about the study that you did where you actually took people with known cancers and people without known cancers.

I think there were maybe 500 folks or something like that. Tell us a little bit about that study, because I think this is fascinating. So, doctor, you know, it was an early study where they took 500 cancer patients, each with a history pathology report and a bit scan and 500 cancer, 500 non-cancer patients.

Now, in the design of the study, they wanted to ensure that each batch actually had cancer and non-cancer samples, because they wanted to ensure that we didn't just pick up that these this is a cancer batch and therefore have ideas in terms of what is cancer and what is known cancer.

They wanted a mixed batch, right? So they had actually tied up with corporates where they would actually taking people that were non-cancer patients. Having said that, in hindsight they should have been a bit scan done on those.

It wasn't done back then, but we had 500 non cancer patients and 500 non cancer patients. Right. All that was given to us in a you know, in our study was a blood sample with the code on it.

Okay. We were able to distinguish between cancer and non cancer with very very high sensitivity. But if I can actually just caution you since since then we have done so many more samples, the beauty test is that we are getting 93% sensitivity at stage one.

No, significant because NHS has put out a paper last year saying that no liquid biopsy gets more than 20% at stage one, more than 30% at stage one and stage two combined.

You can detect cancer at stage three, stage four from liquid biopsy, right? No one. You get cancer at stage three. Stage four you want to detect it at stage one. Stage two.

That's right. And this is why companies like Grail are really not they're really not useful because you really can't. It's really not early detection.

By the time something like real has any kind of sensitivity or specificity, you know, or you have pretty much stage four. So if you're interested, if you have a family, if you're listening to this and you have a family history of cancer or whatever, and you're worried or you want to know, you know, how do I actually understand this?

And, and discover I might be headed down that path as early as possible so that I can actually avoid being diagnosed at stage two, three, or four. I want to be diagnosed at stage zero or stage one.

This is what we're talking about. Yeah. Yep. So you're making a very important point. If I can just illustrate a little bit, there are a couple of different tests that are available in the market.

There's an NDA test that talks about the propensity of getting a disease right. So even break up for instance. Yes, the density of getting breast cancer.

That's right. But it could happen next year. It could happen ten years later. It could happen 50 years later. It may not happen even if you have the mutation.

That's right. So that is what a DNA test is. DNA is about propensity. After that you have other specific tests for example you have colonoscopy that you could do or mammography that you could do for breast cancer.

Study results and stage-one sensitivity

Yeah. Now the challenge with that is that let's say I have colon cancer in my family. I do a this could be for five years running at the end of it, right after a lot of discomfort, I find out that I do not have colon cancer, but I got brain cancer.

But that doesn't really help me, right? That's right. The different types of cancer 3000 subtypes of cancer. Breast cancer alone has six different subtypes, right.

This is where the liquid biopsy test actually has its value. Right. So in all fairness Grail was right in understanding the implication of actually having a multi cancer blood test because it is noninvasive.

The challenge however, if you remember in 2019 they had written a famous paper where they had claimed that for 12 cancers, they were getting 18% sensitivity at stage one.

And all the oncologists had written blog saying, this is not translational, no non-strategic cancer we want to detect late stage 118 is not translational medicine then said that they are doing a large Galatea study.

The study results are in the public domain. I would recommend that people go and take a look at what the results were for stage one and stage two, right, because that's what matters.

That's right. It's very low. Very low, meaning these guys are getting low results on that area. So so really what you're saying is, stage 193% now in conversations you and I've had and previously we've talked you've talked, about the ability to actually understand if somebody is likely to develop cancer.

So we're talking about not only stage zero but maybe stage, you know, pre zero, from this test. Right. So tell us a little bit about that. Because my point is that if you were to have this test done, if you're listening to this and you were to have this test done, it's not a binary kind of scenario, oh, I have cancer, what stage is it or I don't have cancer?

This test can also tell you whether or not you're likely to get cancer in the next year. So explain that to us a little bit. So, doctor, you know, there's a very interesting, you know, concept, of, Benjamin Gompertz, he's an English scientist, where he plotted the number of tumor cells on the y axis and time on the x axis.

Yeah. And he said, if you plot the number of tumor cells from 0 to 1 trillion, right. He said the tragedy of cancer is that we only understand the disease from 1 billion to 1 trillion cells.

But that, right, a billion cells is equal to a one cubic centimeter tumor. It's a small tumor in any cancer at stage one. Yeah. Now, the question that begs to be asked is why do we detect it?

So that was why do we first detected at stage one then. Because the confirmatory test for cancer is a bit scan. A bit scan is nothing but radioactive glucose I injected into myself.

Yeah. Because the chicken is growing so fast, it wants fuel. What's the fuel? Sugar. And when the sugar goes there. Now, what was, invisible disease? When I do a Pet scan, a scan it like I can literally see that there's a tumor, right?

The tumor here. There's a tumor here now. Sad fact is that the reason it is so important to reach that size is because at that size, you have enough sugar optic value to be visible on a Pet scan.

That's right. It's resolution of the scan. Yeah. Correct. Right now, unfortunately, just because it becomes detectable at that stage is not necessarily when it gets detected. Why?

Because no doctor is going to send you for an annual Pet scan. Each Pet scan is equal to 70,000 X-rays. It will cause cancer. So you get sent for a Pet scan when you have a symptom.

That's right. You can come later. Which is why even in the US, even in the UK, 50% of the cancers are still detected at stage three. Stage four I'll remind you of my very first statement in the paper.

This is a very in this presentation, the very there's a big cost to detecting this disease lead. That's right. The beauty about our test is that because it's a causative marker, we are literally able to tell you when the number of cells that are being detected is getting close to the billion cells.

So since we are able to detect it when it is technically stage zero. Having said that, let me actually tell you that we cannot claim that what we claim is a risk assessment, right?

And this is high risk. The reason being that unless you have a confirmatory test that can guarantee it, we cannot claim that this is imminent cancer. Right.

But but the reason we think this is so important for people to know is because, like I said, that if you know that you've got a risk, right?

Risk assessment, prevention, and broader disease signals

And you're able to do the whole organ biopsy, and we can even warn you that this is the organ we think is at risk and know there are there are things that people can do even at stage zero, we believe that there will be tests, that there will be interventions, that pharma companies will come in, which will with which will be much milder and that is given to patients today.

And that is why we think it is very, very important because it can become a manageable disease. Yeah. I think this is an interesting point that you make, right?

Because I think if you if you had a test done and let's say you didn't have a billion cells or you didn't meet the criteria for stage one, but you were somewhere along that path.

You know, one of the first things to do when you talk, when you think about beating cancer, you really have to understand why did cancer form in the first place.

And so if you got that early or got that early signal, then it's a question of, okay, well, what are my genetics? What is my genetic predisposition here?

Also, what's the status of the toxins in my body. Right. Because we know toxicity. What's the status of chronic infections. We know all these things can really help precipitate cancer.

So now you start to actually dive into those questions okay. What's the status of my toxicity. How do I detox. What are my detox genes. What chronic infections am I carrying.

And then what's the status of my immune system. Because we have the ability to rebuild immune systems. And

many people's immune systems are weakened either by chronic infections or toxicity or the aging process itself or short telomeres.

And there's the ability to go in. Now, if you get this diagnosis that, hey, I'm on this pathway, I'm not there yet, but I'm on this pathway, there are many things that you can do apart from poisoning the cancer cell and there are things you can also do if you do, a test and you see a circulating tumor cell, you know, at this early stage, then you can actually design treatments that will go after the cells.

So now you actually have a comprehensive approach where you're actually going after toxicities, infections boosting the immune system and make it difficult for the cancer cells to divide.

And you're doing this all at stage zero right. So this is to me this is the future of how this is addressed. Yeah I believe doctor I can see why this would appeal to you.

The challenges that unfortunately, you know, because the detection of cancer is typically at a late stage. Even the medicines that are being given out today, they're like, you know, hammers.

Oh, they're nuclear. The nuclear weapons as well. Korea, nuclear weapons, collateral damage. Right. Correct. And our view is that if we can make it into an early disease, right, the emotions would be a lot milder.

Right? But at the end of the day, you need to actually get this disease in control. And the reality is that, you know, cancer stats show, studies show that cancer start showing signs two years before, the tumor forms Alzheimer's, showing signs five years before.

Right. The nature of our research is that we are actually picking out RNA markers that are specific to different tissues, but we are doing it from the blood.

And you can do this. We can actually intervene early in a number of diseases. And that is why we are so, so driven by what we are doing. I think it's super helpful that you can also identify organ, which is really in a way, it's tissue type really is what you're talking about when we think about organs. Right?

I mean, let's say it's in your kidney. Well, if you, if you know that this is likely to be in your kidney, then you're going to be a lot more scrupulous and a lot more focused on actually imaging the kidney than you are the brain per se.

Right. So there, there's a lot of, there's a lot of action. My point is there's a lot of actionable information that comes out of this early detection.

In fact, it's the place where you want to be taking the most action, quite honestly, because this is your best opportunity to actually squash this. Right.

And then create a healthy substrate where you don't develop it again in the future. Yeah. So, doctor, you know, the first study was actually just trying to distinguish between cancer and non cancer.

What we realized was that stem cells are a very interesting way to study it because there are there are specific cells right that actually carry tissue signatures as well.

If you understand the lineage of those cells right, we are able to not only tell you about the fact that you're at the imminent threat of the disease, we can actually tell you which organs, which pathways, in fact, are realization is that the oncologists are more interested in that than early detection.

Yeah, because that dictates that. Look, just because five people have lung cancer, the medicines that will work on two of. That's right. Completely different.

That's right. And that is the beauty of being able to actually capture a circulating tumor cell is it's possible to do DNA sequencing on those cells. And actually understand what they're susceptible to, what they're resistant to.

And then it's also important to understand that if you have you don't have a billion cells, let's say you have 500 million cells. That is not 500 million cells that are all the same.

That's 500 million cells that actually there are a population of different genetic makeups in there, too, right? So it's, it's a tricky wicket. This is why it's so important to not just focus on making it difficult for the tumor cells, but actually boosting the immune system, because ultimately it's immune system that wins the day here.

Right? So yeah, I couldn't agree more. The reality is that inflammatory markers immunity markers. Right. But actually understanding that particular pathway gives doctors the ability to intervene.

That's right. And that's the other piece of the work that we are doing, which is actually quite breaking more than just early detection. Yeah. Because we will be able to actually give information that doctors thought you could only get from tissue biopsies, perhaps give it to you from blood samples itself.

Yeah, it's very empowering. It's very empowering. If you're listening to this, your traditional oncologist may or may not encompass all the things that we just talked about in terms of toxicity and genetic predisposition and chronic infections and immune immuno senescence, if you will.

Lack of immune system function. They may be looking just at the tumor cells they seem to be really infatuated with, with the tumor cells. It's like that's the whole story. It's not.

It's actually the end product of a whole process that's led to that. Right. So you've got to deconstruct that process to really solve the problem. Tell us a little bit about I know that you can use this test also in other disease states.

Where you can actually preemptively kind of understand if someone's on the path to, let's say, neurodegenerative diseases or things like that. Do you want to talk about that for a little bit?

So, doctor, the interesting thing is that we are able to actually pick up signatures, neuronal signatures, lung signatures, renal signatures and so on and so forth.

You know, straight from the blood, right? Because the understanding is that actually it's the stem cells that are growing into the tissue cells right now.

US rollout, clinical adoption, and future vision

Interestingly, the problem is that the tissue cells actually have give you a lot of tissue signatures, but they don't mobilize in the blood, right? Which is part a biopsy industry exists.

Right? Yep. While a stem cell, a pluripotent stem cell mobilizes in the blood but does not carry tissue signatures. Right. We listed this the entire lineage of cells.

Right. And we understood the cells that are growing from the pluripotent to the tissue cells. And if you are able to actually capture those, we are able to actually give you tissue signatures as well.

Okay. The application, which is why we say that we are able to tell you that for all cancers. Right? And this is an important point to note because you give the example of neuronal diseases.

The reality is that when it comes to NB, right, you shouldn't see those signatures in the blood because, the invariant. Right? The interesting thing is that these stem cells are small enough that they are able to permeate.

And because of that, we are able to actually give you information on the affected tissues, including neuronal tissues. Right now, the point is that if yeah, if we are able at the application is many other diseases.

That's right. That's right. So just so the audience understands this. So what we're talking about here is a truly these very small embryonic stem cells are truly pluripotent, meaning that they can they can become any cell in the body.

Now many stem cells don't have that capability. They're already pre differentiated, if you will, into a mesenchymal stem cell. And you know, something other bone marrow stem cell or that kind of thing.

And so in that case they have limited things that they can actually become. But these very small embryonic stem cells can literally become everything.

And so that's, that's really interesting. And it's nice because these, these pluripotent, very small embryonic stem cells serve as kind of a was a reservoir and a reserve of stem cells.

They're actually the stem cells beside behind the stem cells in your bone marrow. Right. Because when you start to deplete those, these very small embryonic stem cells can make more of those for you. Right?

So they're there for a reason. And so having access to these pluripotent stem cells, which we all carry is very important. What he's talking about now though is if you start to see them differentiating down a particular path, that's the clue that they've used AI to actually figure out that this is now going down a path about, you know, Alzheimer's disease or is going down the path of a lung cancer or that kind of thing.

And that's just so you understand, that's kind of what we're talking about here. This is really, really very cool stuff. Let me let me answer in a different way.

Doctor recapped together captures so much data because we are capturing like, you know, signatures of multiple genes right from these cells in the blood.

Thank you. And the point here is that when you capture that much data, if you're focused on a couple of different markers to figure out whether this is cancer or not, that is one aspect of it.

But if you can, if you use AI to actually figure out a whole lot of things that you weren't looking for, right? What it will what the reason it will have an impact is that we may actually then be able to tell you that you don't have cancer, which is why you would comment on the test.

Interestingly, we could actually tell you but you're showing early signs of this particular disease. That's right. Because those those are not what, what, what what the Bioinformatician is looking for.

Right. The guy can pick up right. That's right. Because there's a whole lot of other data that we are picking up as well. And like is what you think. It's so life changing.

Yeah I agree it's a great point. You know, a test is really only going to find what it's looking for. And so what he's saying here is that this test is basically casting a very wide net to be able to look for many things simultaneously.

Right. And so therein lies also its power, not only in his power to detect things early, but to detect many things cancer a non-cancerous early. So it becomes almost it becomes almost a universal test in one sense, or at least the closest thing we have to that at this point in time, for actually knowing where you are in the aging process with regards to developing some sort of a disease that you don't want to have.

And that's incredibly powerful. Yeah, cool. Very cool. Look, I think I think it's going to change a lot of lives. The important thing is, though, our immediate focus is on cancer.

That's what we are focusing on. That's what we are driven towards. And, you know, if we can make it into an early stage disease, I think that'll be, just a good vision to have.

That's right. Yeah. We are jumping ahead here a little bit. It is focused on cancer at the moment. So you're in the middle of. You just completed our, study in England.

I think with the NHS, the National Health Service. Right, right. And they're analyzing the data now, I believe. Is that correct? And then people are going to wonder, well, when can we get this in the US or when can this test be

available in the US.

What's the. Latter? You know, look, U. S is a very key market for us. And you know, we've actually had a couple of investors from the US that have actually done, a significant amount of diligence.

And one of the key reasons for why they invested is they said, how can this be available in other parts of the world and not us? Use is for a very good reason.

It's it's 50% of the the world's health care market. And when it comes to innovation, to be very honest with you, the US has always led the bug. And, we have actually had a couple of very, a lot of meetings with, labs in the US through our investor.

And, we expect that, we expect to launch the service in the US before the end of the year. So this is going to be available, very shortly in the US. But in the meantime, we've had a lot of people actually flying in from the US, either to India and UK, where it is available.

And having just done there. Yeah. Okay. Very cool. Yeah. That's that's a, that's super impressive. Well Ashish, I really appreciate you taking the time to chat with us today here.

Your, your insights and your wisdom and your obvious passion for this. Right? You're very passionate about changing the world with this, approach to testing.

And so we really appreciate all the efforts that you've put into this. You and the entire company, for that matter. Yeah. Doctor, you asked me why this was so personal to me.

Yeah, I, you know, lost, I lost my brother in law. Okay. Who thought he was one of the most, impressive human beings that I have known in my life? Very public figure in India.

Unfortunately, he fought for stage cancer to, for two years, and, you know, the important thing, however, is that his cancer came back after 16 years because we in the field, patients with cancers come back after 20, 21 years.

That's right. And it is back to the point that you made. Tell me which cell is surviving for 20 years. That's not a cellular disease. It's a stem cell disease.

And a stem cell is immortal, right? Yeah. Therefore, actually being able to detect it early is so, so important. Yeah. Think about cancer survival. They're living with the risk of this disease coming back.

Right. And that is the reason why we are so focused on it. We need this particular marker after my brother know. And, one of the things that we are passionate about is that we want to drive the price down, make it move for more and more people.

The envision is all 8 billion of us doing this test once, once a year and catching this disease at stage one every time. Because in the fall, if you catch this disease early, it is a weak disease.

And that's that, that the company has. Now it's a beautiful vision. You know, I think the other thing that you brought up that's interesting is this idea of recurrence.

So in people that have been treated for cancer, of course, you know, everybody's heard the story. Well, you're all clear. And then four years later they're in stage four or whatever. Right.

So and we know that's that's related to a number of different things. But being able to use the tests not only for early detection, but also to give somebody an idea of how in remission am I right where I am, where am I on the remission scale, so to speak?

Right? You can almost define a new scale there, and then you can either, take additional actions like we talked

about in this global approach to it understanding the immune system, toxins, inflammation, infections, etc., you know, to where you really, decrease the risk of recurrence because there are a lot of people that have been treated for cancer.

But are worried about recurrence. And so, I think this test could be incredibly useful. There. Is that is that correct? Absolutely. Absolutely beautiful.

All right. Well, thanks again for all of your all the work that you're doing. And it's great to chat with you again. Thank you. Thank you Doctor Deb thank you. Bye bye. Bye.