



INTIENT SUMMIT CELL & GENE THERAPY PANEL VIDEO

VIDEO TRANSCRIPT

We're going to move into a, a, a panel discussion now. So I'd like to introduce our next facilitator, another colleague of mine, Brad Michael, who's our Senior Managing Director in Accenture as well, and leads Accenture's Life Sciences Practice in North America. Brad has been working in R and D for many years and has helped many client organizations transform in R and D. And definitely manages doing that with coaching his all of his boys sports teams or several of those spokes teams. So great pleasure to have you here as well, Brad. Thank you so much and I'll leave it to you to introduce the rest of August. And Nia, I'll do that excitedly.

Thank you Rahul, for that. I will tell you that as the team took me through the prep for today, I didn't quite piece together that it would be Dr. Topol, world renowned cardiologist, Dr. Shah, Harvard Medical brain tumors, and then Brad. I apologize in advance to all of you for that, but not not to fear. Luckily, I am joined by an esteemed panel today, which I'm really excited to get to introduce here in a second. I love the way this day has set up. We've just heard about incredible scientific innovation. Dr. Shah, cancer cells killing cancer cells on, I'm in, I'm excited. That's, that's amazing. We heard about the Digital Twins and the long list of other scientific information innovations from Dr. Topol leading into that we heard about humanizing health. And so when I think about cell and gene therapy, I think we're now at that perfect intersection of these two critical topics. It would be hard to argue there's any scientific innovation out there today that's kind of more top of mind, interesting, innovative and relevant than what's happening in cell and gene therapy. And yet at the same time, it's an incredibly challenged space across the ecosystem. Whether you're a manufacturer, whether you're a healthcare provider, whether you're a patient. And so I think that context of the full morning really sets us up for a great discussion here. Without any further ado, let me get into introducing the panel. I'll start here with our guest virtually.

Of course, you just got to meet Dr. Shah from, from Harvard Medical and, and you saw some of the perspective that he'll bring both in terms of real-world research and, and kind of the academic environment. Next we have Ralph Altenburger from Roche, who is the Global Head of cell and gene therapy there. And really going to bring a strong perspective from the developer and manufacturer side of things.

Next we have Mike Mailutha, the AVP at Tableau, which is part of Salesforce. But I'll say in this context, is joining us to represent the caregiver perspective. And he'll share his experiences as a caregiver for a Cartier therapy patient.

And then joining me here in the room, I'll bring up Theresa MAR check, Vice President of Strategy and Innovation at B, the match, the National Marrow Donor Program representing non-profits and provider perspectives as well.

So Welcome everybody. Thank you for joining us. I'm sure the audience was thrilled to hear your perspectives. Let's, let's jump right in. I want to give you each a chance from the start to talk a little bit about your experiences with treatment coordination and where you think the opportunities are, the challenges are from a cell and gene therapy perspective around treatment coordination. And, and Mike, if you don't mind, I'm going to start with you first. I'd like to bring you in here right away. And perhaps you'd be willing to share a little bit about your own personal story and experiences with the audience. That'll, I think really set context for some of the challenges that are ahead of us.

Yeah, thank you. And let me start by saying thank you to everybody that's out there. Hope you can hear me. And our first thank everyone who's a professional that is working day in day out to save people's lives. I was I had been part of the industry for a long time and I had an opportunity to be on the other side of it where my father, who was in his early seventies, contracted multiple myeloma and went through a series of cancer treatments.

First-line treatment, relapse, second line treatment, third line treatment. And we finally ended up in a CAR T program. And I got first-hand to be part of that and watch the patient journey that he went through here in New York City in and see the difficulties that he encountered. And unfortunately he passed in September of last year. So after six years of a very difficult struggle with this disease, he, he passed away. But we did have the opportunity to experience a lot of what the industry is offering in terms of treatment. Which is, I think it's so critical to talk about.

And so my experience with my Father, which is highly personal in nature. Really being with him over those six years and all of these facilities that he went through and all the treatment that he kept to put it in. I got to learn a lot and part of what I'm doing today is making sure that I can participate in the industry to come back to the experts and tell them that they're there. There's certain things that the patients are going through that we have to be very cognizant about and consider in, in the paradigm of how we are actually making medications. I think we tend to focus very much on on the actual medication, the actual treatment, the science around it. And sometimes the patient gets left on the side in terms of what they're actually experiencing. So I know one of the things that mom and my dad I'm saying to me was it's very complicated. I don't understand what's happening to me. I don't understand what they're doing and I'm just exhausted.

The process has been long and exhausting. And then at the very tail end, after he passed, we lost access to his data on which we thought we were going to continue to learn and understand what has happened throughout those six years in and getting access to that data actually has not been easy since he passed away. So a lot of things really to sort of reflect on with this community.

Thanks very much for that, Mike, thanks for sharing your story with us. Of course, our condolences for the passing of your father. And we had a chance to talk a little bit as we as we prep to what we'll come back to this a bit more in terms of some of the more complicating dynamics as these get to be second or third line treatments. And I think you kind of said, you know, almost treatments of last resort. I think we all hope that that won't continue to be the case and these will start to become the first-line treatments. And so in those cases, that the necessity to be understandable and accessible and more friendly to the patient is only going to rise in importance.

Why don't we come to you the next Ralf and I'll switch to the, to the manufacturer's perspective. You're, you're right in the thick of the research, the development, and getting these critical products to market to the patients that need them. That's the end goal here. Once you share a little bit about the perspective on the manufacturing side where those challenges are, what you think the best opportunities are to improve the experience.

Yeah, absolutely. And I think that Mike on support for sharing your story and the story. I definitely want to get there. Now for me, I've been in the industry for about 25 years in the pharmaceutical industry and I've had the pleasure to work with different companies. And I've always been following a strong purpose, which is at the end, everything that we do should ultimately benefit patients. I want to help patients with everything that we're doing. Now for me, I would say in the last few years have opened up totally new opportunities that were available to us. I mean, we obviously heard a lot of very interesting science from the Pasha here. And if we just see what has happened over the last five years, how many new treatment opportunities have been opening up to us?

Then finally, we talk about curative treatment, something that, you know, for, for decades. And many of the diseases, especially like cancer, etc. We couldn't even think of right now. We've been talking about like a once off treatment. So a gene therapy, you take it once and it might actually cure your disease. So the opportunities that we have at hand today are just fantastic from an old world science perspective. And I mean, for us as a company, of course, that's also the ambition that we have. We want to go through a number of the approaches. We have to follow the signs. There's lots of different modalities that be working on in order to actually meet that goal.

Now to bring it back to what Mike said. And that's also an experience, an experience that we're making. This new field of cell and gene therapy comes number one with a very low degree of maturity because it's still very explorative. Things are not well established. There's a huge diversity of approaches which is confusing probably to treatment centers, to patients. And it's also quite a challenge for the industry. And at the same time, it comes as a very high degree of complexity. I mean, if you just look at, let's, let's call it a supply chain. I would rather call an end-to-end value chain that we heard about autologous cells rope. Here's an example. Medulla cells collected from a patient. Then you go through some selection process called freezes to get the right cells, modify the cells, you expand the cells, you give it back to the patient. That's a that's a super complex process in an immature industry, I would call it at this stage. And I think this is actually an opportunity for all of us. If we can work on these complexities, if we could make it much simpler for healthcare professionals, but of course more importantly also for patients. I think that would be a big step forward because I erect like that. I totally acknowledge and can relate to my story that I'd be super confusing for patients. And you're in the middle of it.

You're kind of concert with your disease. And then there's all of that complexity coming to you. So one of the ways how we can this, I say next to, of course, we want to get treatments that may even better. How could we make it also easier and simpler for patients that everybody involved? So that's that's the ambition that we have here.

Perfect. Thank you for that. Dr. Shah stay with the virtual line before I come back here to to Teresa and i'll, I'll let you kind of jump in and expand. And and in your case, as you've described really on the very front line of some of the most innovative breakthrough scientific advances. What's your perspective on this topic?

I think. Mike, thank you first of all for sharing the story of your father. And I think many, many patients and many caregivers are in a similar boat. And as Ralph mentioned, this is a very explorative field. It comes with a high degree of complexity. One more thing I would like to add is that now if you compare this to a pill that an antibiotic or, or, or chemotherapeutic pill.

You know, it comes with a, with a product variability. Basically, every time you giving a cell therapy or a gene therapy to a patient, it's different for each person you want. How exactly the same thing, the same man, because it's a biology called product. And I think we have to really understand that. And I think the key for that is how do we simplify the process?

As I pointed out earlier, that there is a lot of push towards making these therapies more off the shelf where there is less product variability, where it's simple. You just choose the cell type are the wild-type in new expanded and you give it to the patient. 1. One thing I really would like to emphasize on is that most of these therapies to kill and its cell and gene therapies that are very in a way they are now in CAR T therapies. We've seen these working wonderfully well in liquid tumors, is that once they are coming into the clinic, they will always be used with the standard of care.

And in JVMs for example, the standard of care is resection, chemo, and radiation. Now, I think when you bring in a new therapy into the phase one trial, you will always have to figure out how this will be incorporated into the standard of care and where the intervention point is. I think this has to go back into the innovation then and say, Okay, if we're developing something on the bench, have we actually incorporated these in our sort of variables into that, into that orchestration phase that I mentioned earlier when you are basically trying to develop a translation therapy.

So I think that is a huge, there was a huge gap and adding rough can emphasize this more, that there was a huge gap between the academia and industry. They're, academia was doing less of translational work. It was mostly done by the, by the industry after you did some basic work at the industry level. Now that hospitals are tied up to the academia, there's a lot of translational aspect, particularly in cell and gene therapy field that is happening within the academia. And I think if we can bridge the gap between academia and the industry and bring that translational signs to the forefront. I think that's going to be huge for, for how we treat patient in next decade or so.

That's great. Thanks. I'm going to come back to this point about the, the kinda the cross, cross sector and an ecosystem collaboration. But before I do Theresa, I want to, I want to bring you in on the same. You're at, you're at B, the match. And so your, your perspective here is going to be unique. You're, you're sitting in a position where you get to see an awful broad view of the patients, but also the science and the therapy. So your inner perspective,

That's correct ME actually we I think have unique point of view because we actually have different parts of your organization that are supporting patients. Some of the donors that are providing cellular starting material for this, as well as. A lot of people don't know about be the match. Besides being the National Registry, we are responsible for basically globally sourcing, collecting, and transporting all stem cell materials that are used for unrelated donor transplant in the United States.

In that capacity, We have built this profound infrastructure to be able to take this fresh cellular material from any point in the world to any point in the world. All of the, the partnerships that we need with the different collection capacity around the world and the logistics. What we've done recently, our mission as an organization, we are a non-profit. Our mission is to democratize cell therapy. And we believe that our role in that is to really take away the barriers that a lot of the keeps track treatments from getting to patients.

So we look at it from the standpoint of how do we take some of the structural transaction costs out of the system so that more treatments can get to more patients. We do this through transplant. We also now are, we've opened our ecosystem up to some extent therapy companies. Because of that, we see a lot of the, the challenges. That's my three co panelists have mentioned firsthand, we we work with the health care providers that are trying to figure out how to navigate the different protocols for some of these treatments, trying to order them trying to get there, be qualified in order to be able to provide the cell therapies.

We work with the cell therapy companies that are innovating, busy innovating on a number of different dimensions and hadn't, we don't know yet what works. But in the process, they don't know enough about what the standard operating models are within a collection network to be able, should we be, what should we be innovating on and what should we actually try to standardize. So we've really been out working with industry and providers to, to try and understand where can we start to, to develop best practices are standards and evolve those standards over time. We think that will be one of the biggest opportunity. I even Mike story. One of the reasons this is so difficult for healthcare providers to adequately prepare their patients and have the patients really understand what's happening. It's so variable that the, the actual providers don't know enough to be able to walk their patients through this process. So anything we can do to try and build some of these standardization will help the patient as well as the provider and get more of these therapies out in the world more broadly.

That's great. Let's, let's actually stick with that. If you don't mind, I'll stay with you and then we can see what other perspectives the panelists have. But can you talk a little bit about how the collaboration does work across the sector, across the ecosystems of the variety of players. Where's that coordination happening? How is it happening? And maybe what opportunities do you see to really improve and enhance that collaboration shouldn't right now it's very fragmented. I think every company where the collaboration happens, it's oftentimes driven by the CROs today and the relationships that a CRO might have with the various sites. So they end up being a really critical component to helping to bring people together. But what that has created is, I think, some different disconnects because heroes, there's very few CROs also that have a lot of experience with cell therapy.

So they've often come from other types of pharma backgrounds and they're just as busy learning some of this, the uniquenesses as everybody else. So I think you end up having these barriers of communication at every step of the process. That that even though I think there's a lot of good intent and effort, There's not a lot of opportunities for people to really be talking to the folks on the other side and learning the various complexities that throughout the system.

Maybe Ralph, how does that work within Roche? Large global organization, diversified business. How do you, how do you see that kind of come to life within, within your organization and kind of the role that you try to play at Roche in terms of collaborating and integrating across the players in the ecosystem.

Maybe before we get there in terms of what we do at Russia and plans for the coming years. I just want to echo what I heard here. It is really a challenge in terms of the lack of standardization across these processes, the diversity of the processes which obviously go and that is a huge challenge. And I think Audi in both players realized that and every effort that we can do together, and I mean, health care professionals involved zeros. The industry and science was to come together and tried to standardize is actually a big step forward in order to make this process more efficient and at the end of the day scalable, right? I mean, we have to be because if we look at Cathy.

Therapies today, yes, of course, are currently bit more limited to liquid tumors. And they actually also limited in terms of how many patients we can treat simply because of the complexity. And by standardization, I think we could actually scale it in a different way to make it to drive access to much more patients that we currently can. Now, in terms of how we look at it as, as an industry or specifically Roche Genentech. So for example, we are working with the standards coordinating body. That's the body where different players come together. Where it's all about, okay, how can we find standards and norms in those treatments? It goes across various areas. So we've talked about autologous cell therapy might be the way how you collect the cells, the way how you go through the apheresis process, et cetera, et cetera. This will all benefit from standardization because it is really confusing. If for each and every treatment option at each and every involve player or company, if you like, or in academia, I feel like you have to go through a different protocol.

So we need standardization there in order to make it efficient and drive scalability to reach more patients. One of the things that we are currently pushing is a collaboration also with Accenture, a treatment center part. We heard a lot about orchestration, and it is about orchestrating the patient journey. And that could be done by the use of digitalization and at the end of the day, software. And if that was done in a standardized way, and if not every player would come with their own baby version of a treatment center part, which is the interface between those people manufacturing the cells and those people in the clinics applying it to patients, right? Again, these are all efforts that we're driving from our perspective in order to come towards standardization, which again, I'm repeating minus 100 for you, will help us also to provide more access to patients.

At standardization, certainly ringing out loud, loud and clear and that thanks for that. It might maybe it I'll let you answer the question a little bit differently. Maybe less about the what needs to be done, but I'd, I'd like to understand how that manifests itself for you. In terms of your experience, your father's experience, what challenges does the either coordination or lack thereof or the complexity and the handoffs in the ecosystem create for for you as the patient and caregivers.

Caregiver. Yeah. So I think there's two there's two ways in which I could I could share on this. I think one is the actual treatment, the medication that you receive today that processes is quite fragmented and you have to wait as a patient for one step to be completed, for another step to commence. And you don't really know what's what's determining one step to the other. So I think one thing the community can do is figure out where the patient, how could you help them see through an iPad, some other mechanism where they are in the process and what some of these gate checks are that they're actually have to go through. That gives them a sense of the trajectory and the destiny that they're going through. That's not there right now. So you're just basically like waking up, kind of wondering what's next, what's next? When does this happen? Huge delays in the process. So I think the better the more we can integrate that and make that a very simple view for the patient, almost like you're in Disneyland and you kind of have a sense of where things are happening in some very simple form I think would be helpful.

The second component of it is really, is really very challenging, right? It is at what happens outside some of the treatments, right. From getting to the facility, from actually entering the facility way, care can be administered to you.

And then what happens when you actually go back home? And there was health care providers are not there, you know, notice really 24, 7, but they still treatment that's ongoing. How do we have visibility to that and the data that's going on there. I think it's so critical. In fact, I would, I would tempted to share with this group and say that those things are actually more important than the actual treatment itself. Because what I saw with a CAR T program, it's very powerful, very promising. We were getting good efficacy from it. But my father was so exhausted, so physically exhausted from the supporting ecosystem that he was like, I can't take it anymore. And because of that, was not willing to move forward with the treatment because of the burden that was surrounding it.

So I think if there's a way that we can take very simple things like that happening to the patient on the peripherals. What maybe I'll turn disease management and manufacturers and providers should start to think about this. Ancillary services that can be attached and it can be become part of the patient as they go through and take those things very seriously. I think that would make a really big change in the way the patient is actually experiencing the care as it's happening. And not only just for them, but also for their family members who tend to be in these rooms with them the entire time. So I think that's where we are. I know that there's a lot of professionals here.

We're really focused on the science, right? Like how did we get better efficacy of the medication and how do we get better administration of the medication? We may have lost a little side to the particularities that are happening to the patient as they're going through this.

Yeah. I think that's an incredibly powerful statement. I mean, it kind of says it all and I know you probably can't see the full audience, but I saw a lot of heads nodding in the room. When you said that the the kind of the experience surrounding the therapy could actually cause a patient to say, I'm no longer going to move forward with the therapy. I think that's that's probably the one of the most powerful proof points that could, could tell us we need to continue to focus in this space.

What, why don't we shift a little bit to technology? And there was a question that came up actually earlier in the earlier panel that I liked and wanted to ask here as well. I think technological innovation is really at the forefront, an apparent probably to all of us day in and day out. And so my question is, what is the role that technology can play to actually help address the problems that we've just been talking about. What is that? What is that role that technology can play? Digital solutions can play coupled with the science to actually impact and improve the patient experience, the coordination and the disease management around it.

And and Dr. Shah, maybe I'll come to you first with that one and let you start before I open to the other panelists number and It's a great question, but I just want to add to what my mentioned earlier. And three years, four years, 3.5 years ago, my father got diagnosed with GBM as well. And at that time, our paper on cancer cells killing cancer cells coming out. And one of the toughest decision hour I had to make in my life was to was to decide whether we should until we so so the neurosurgeon, I was taking care of him. He said, I don't think we should do surgery. I don't think we should do radiation and chemo, but but your call and I went back to my my family and they said it's your call as well, you know this better than anyone else, so you make the decision. And as Mike also pointed out that you basically have to add that point to know that usually for JVMs, the, the average is 15 to 18 months after diagnosis. You hardly 98 percent patients to not make it beyond 18 months. And in this case, in my father's case, it was they said formats. Now one of the tough decisions was, should we intervene with chemo radiation and decrease the quality of life? And I knew that the quality of life would decrease or should we not intervene. And enough, just let it go. And I think we decided, given his personality and how he would not have liked us to take care of him too much. That we want to intervene. And adding these come to this central, I think these decisions come to the center of the technology as well. I think we at some point, particularly for diseases like GBM where we do not have hope.

We have to make these calls. And I think if if both the caregivers as well as the doctors and patient in this case are in sync. These decisions will be made much easier. But coming back to your question on under technology. And I think absolutely that there are sort of connection between what we know from patient samples, for example, or from the AI. And bringing this back onto the bench and developing technologies that actually have looked into this prior to actually bringing it to a, to a preclinical stage or to even a phase one clinical trial. And I think as I pointed out earlier, that that has been missing, that we think we have a therapy based on something really in a way do that works in a mouse. But we haven't put a structure around these. Now we're doing it over the last five years. I think this has become pretty evident that, that all the cell and gene therapy preclinical studies are exciting. But it is a huge effort to bring them into the clinical settings. And that is why. The translational aspect has to come in much earlier to the band stage. And that also means that the technology and the pathology revolving the GBM, the the omics data on patients has to be much more open and has to be accessible to the, to the scientists who are developing these therapies are, are at the forefront of the innovation. And I think that is a key, key change that is already happening. What should happen more. Thank you.

Thanks. Thank you. So the so Teresa, that Dr. Shah talked about the access to data and then the role of technology coupled with science to, to actually create and find and bring to market that next therapy. Maybe I'll ask for you more in terms of the patient coordination side as in the role that you play. You know, how could technology help to improve and remove the friction that you see in the process? For your own organization. For health care providers broadly for the, for the patient. What's, what's that role?

And I think the way it was asked this morning, we think technology often dehumanizes, but what's, what's the role technology can play in actually helping to humanize this experience a little bit better. I go back to some of the things that Mike said here about the patient experience and also Chris had brought it up earlier. Comment, I think when you can make give some more certainty or at least more clarity around what patients can expect that actually can be a real humanizing moment. So I think creating that kind of clarity for patients. But also again, I were, as Ralph said, the standard coordinating body is critical, crucial work and the work we're doing to try and standardize. These are complex therapies that are going to remain complex therapies with a lot of unique features. Technology can actually potentially make that easier for the provider as well to switch from therapy to therapy if we do it right. So that takes some of that potential errors and even there's still going to be extensive need for training.

But how do we create tools that actually walk them through the individual, the particular needs of a collection or an apheresis, an infusion back. So that again, take their uncertainty out because there's a lot of the same sorts of anxiety on the caregiver side or the provider side as well. Great. Mike would that I'm going to guess that that kind of technology access would have improved. Your situation, would have been welcome, would've reduce some of that exhaustion. You talked about that maybe you'd like to expand.

Yeah. I think yeah. I think that's a step in the right direction, right? I think what we have to think about it just really very basic and simple things at this point in time, right? Technology, we tend to think about these very sophisticated solutions, but actually it's very simple things like, you know, getting from your home to the provider facility. It is a way for us to enable that process with technology to become easier, right? When you arrive at the actual facility being processed and having a sense of where your entire next three or four hours are going to be spent, right? That's things that we have the technology to solve that today. The other piece, I think that's really critical for anybody that's in these type of treatments is I've been here for x number of weeks.

You've been running all kinds of tests on me. Is there a way that I can see how all this is coming together with, Sir, a stripped-down of its complexity. Is there a way to break pod as data we already have and, and analyze it and then make it visible to me in a way that I can easily interpreted and no. Okay. Yeah. You know, I'm moving a little step in the right direction. Things are actually getting a little bit better. And I should be patient, right? I think we have all those tools, but there's no one really packaging it together to bring a solution to the patient currently. I think maybe that's we have to ask ourselves, is it the provider is at Columbia University or Mayo Clinic way you'd be or is it Is it Roche as accompany that would be, you know, helping package some of those services up for patients that will just make it so much easier. I think that's where we are. The technology absolutely there.

The ability to provide it is also there. But I think that for some reason it's actually not a pleased with that we're focusing on right now. And I think if we could, it would really improve the process so much. That will make it tolerable for the patients to be able to go through the tougher sides by b and the downside risks of some of these medications that they're encountering because they feel so supported on all other friends. That's that's sort of my perception and boss coming out of what I've been through for the last six years of blame.

Thanks and Ralph, I want to give you the last word on this technology question, but before I do, I just want to tee up the audience that I'd like to open this up to audience questions as well. So get your questions ready. We'll go there next. But, but Ralph, I'll give you the last word on, on this one in terms of the role of technology throughout the process and in particular, and how it could help improve the coordination of care.

And it's maybe if I wanted to make my life easy, I would say all of the above. But let me explain more what I mean. So I would kind of currently segmented in three areas. The first thing is technology should also help us to safeguard the entire process. So for example, if we talk about autologous products, right? So you get cells from a patient, you manipulate them and you get them back into the patient.

And as a manufacturer, you don't do that for one patient. You have many patients like you absolutely have to safeguard that process to make sure that there's no chance for any mixed up anywhere along this chain, right? And this is what we call a chain of custody, chain of identity. So technology digitalization is absolutely key in order to make that process a 100 percent saying. I think the second thing is clearly also the exchange of data.

We are all learning. We're learning together is a new and highly innovative treatments where with every patient that is being treated and the way how the patient reacts, the circumstances around the treatment to certain changes that you might have had in the process of providing the cells, et cetera, et cetera. This is all great learning experience where at the end of the day patients, all patients will benefit. So how can we make it possible that this data is exchanged between the various parties involved, that the clinician knows exactly what has been done at the manufacturer's place. The manufacturer knows exactly okay, What has the effect of what we did on patients, meaning in terms of safety and efficacy, right? And then last but not least, I also see that opportunity that Mike was, was talking about getting actually more transparency and visibility into the process. I would probably not go as far as Mike did because again, knowing that this is a super complex area, it also needs a lot of expert interpretation. So I think we're not yet to hear that, you know, you will have all the data available for the patient and make your own conclusions in terms of oh, my treatment is going in the right direction. I think that still needs the expert's opinion, the physicians the treating doctor opinion and help in order to interpret it.

We are the accurate when when are they getting back to me? When is that being applied to me? So what is the next steps to come? And of course then also, as best as we can, you know, what is it doing to my body or my cancer? And how can I get a sense in terms of how is it working in my body, then ofcourse would also be awesome. Outstanding. So predictability of experience, visibility into what's next transparency into to where I stand and all kinda fewer fueled by the power of access to data.

So with that, I want to open it up to the audience and see what questions we have for the panel. I know we have a mic that will come around and Rahul or Tony, I might need a little help on the ANY questions coming in virtually if somebody could help me with that as well. But let me let me let me see what we have here in the room first. Just here.

Dr. Shah, perhaps potentially first, you know, you mentioned that the simplification of going from autologous to allergenic is perhaps one of the key things in terms of being able to expand access to cell-based therapies in general in your lab. And we've done some remarkable science as we see it. What can these tech industry do in terms of bringing learnings from other parts of the industry to make the transition smoother potentially. And Ralph and others as well. Thank you.

That's a great question. I think it's basically going back to what I said earlier than that. You know, we have to intervene early on when when we're starting something that we think could be could have an impact as a potential treatment down the road.

So I think it's, now if you look at it from a science scientists perspective and particular labs, they are trying to do their signs. To write a grant to get a publication. So they're not in a, from, from a scientist's perspective. It's, it's, and I've gone through this myself and I'm sharing that experience as well. Is that okay, I will do some innovative science, probably get a publication that will lead to me getting NIH funding or other funding. And probably I'll get promoted at some point.

That is the major perspective of any junior investigator who goes into the signs. And I think the latest somewhere mid career, you start realizing that, oh, this could have a potential translational impact. And, and many scientists have their own comfort zone. They, they, their comfort zone is from a bench to a mouse room to publications, to, to getting funded. And very few individuals actually go out and seek industry or form their own start-ups and start interacting. And I think it will, to come to your point.

They self clearly is that, you know, I think the hospitals and the academic institutions to open these avenues and we're doing this within the m gb system. The Mass General Brigham sort of combined system is where we're opening the doors for, for these investigators that they have access to two different companies, two different sort of avenues like this, one that they know what is patient's perspective? What is a caregiver's perspective at a, at a bench level, at a very basic science level. They're not exposed to that. And that could, you know, with, with more sort of technology is evolving. And that could be done. And that is, I think slowly happening.

Great, thanks for that question. Maybe wrong problem online.

We do have a question for one minute. So can the panel address the difference between standard treatment versus individualized treatment plans? Perfect? So the, so the question is, if you think about that, the paradigm of the standard treatment versus ones that are very individualized. You talk about those dynamics maybe relative to what, how they bring different challenges and different implications for each, especially with respect to the to the patient impact. So happy to start here in the room with you.

So I think some of my fellow panelists might be better, but what I can bring to the table too, is I think whenever you've got this one-to-one where you have a, there is some sort of a genetic component to what you know and what that patient needs. And then you find a particularly from you have to either manipulate their own cells or find matching other cells. That puts a great deal of risk into the system. Standard of care still actually has an important role.

So I'm going again, I think the work we've been talking about with standards to try and actually find ways where you can find common practice, where it makes sense. But I think that actually comes probably more important in the cases where you've got this one-to-one therapy at the end of the day that's going back to our patient. Thank you, Ralph.

Maybe I'll come to you next year perspectives here and those dynamics. So maybe just one clever kid. So standard therapy and B, from an industry perspective, we like to refer to it as make to order, make to stock. So make to stock is in essence you produce a, a, a medicine in and the one bench that you produced with so many patients, it is, it's usually in a much more standardized way. You have less variability in it. And it's finally delivered to the patient on-demand. Now when we talk about make to order or individualized therapies, you make one product which is a 41 signal patient. And kind of tells you already that naturally the variability that you have and that process is much higher. For example, if we were talking about target cell therapies, you get cells for patients that are very sick. So already the status of these cells comes with a high degree of variability. And I think that drives to a certain extent than the variability in your, in your treatment outcomes. So I think that's probably one of the main factors how I would look at standardized and individualized. When I don't get more into the the, the patient experience. Then it's a little bit what I said earlier. I mean, as a patient, when you know that material is taken from you or information is take it from you for example, at times it's just a biopsy that's the sequence. And then for example, in personalized cancer vaccines, you produce a medicine that is very specific for the patient. It's kind of naturally that as a patient you have I don't know, it may sound stupid, but it is like this. You have a totally different relationship to that because, you know, it's, it's it's coming from you and it's getting back to you as opposed to, so to speak, I take something off the shelf and that requires a totally different way of handling it. And like said, also, you have to look at it differently in terms of how does the patient experience.

Thanks for that. I'm going to close us out with one final question. I'm going to ask each of you to respond and I'm going to give you I'm going to ask you to do it in about a minute here. But my question is, if we look five years out in the future, what, what is it that you see that in terms of where, where the treatment paradigm for cell and gene therapy has emerged scientifically and from an experience perspective that this space is evolving so quickly. It's, it's no longer nascent, it's real, it's here, It's now, and we know the pace of evolution in the industry.

So, so five years from now, what do you see is the reality that we're in? What do you, what do you hope to see and what do you hope is true? And and so Theresa, maybe I'll start with you and then we'll go to the panel.

I hope that we've learned some of the basics of operationalizing or translating these therapies, at least some of the early ones into something that really fits within care models. And we've adapted the care models to take them. And I hope we have health care professionals that have developed more, that have the expertise in how to both manage the the treatment as well as help the patients through it. And that we have tools that actually can enable all of the people that are involved in this process to understand better what's going on throughout the experience.

Perfect. Dr. Shah can be your next work. Where are we in five years?

Yeah. I think we'll we'll probably have less product variability. I think that's 11 thing and I think there will be a clear choice between WHO, which patients really need orthologous therapy and where we can focus more on off the shelf. I think that is that is coming. There will be more off the shelf therapy. There isn't, there are no NK cell and T cell therapies that are also becoming more off the shelf. And I think we, we, or any field takes at least two decades to learn fully. And I think what will happen is that we now have learned so much in last 89 years from in excel jet cell and gene therapy field that there will be new in a way to therapies that have taken into account all the failures, all the lessons that we're learning now. And those will be much more robust and much more impactful. At Standing Rock poverty or I mean, I would definitely hope that in five years from now, one hand through like standardization and through learning, along the way, we will be able to drive a much broader access for patients with there are certain things that are currently still like limiting access, the availability of these treatments, quite frankly, and we haven't talked about that at all us to certain extent the cost of this treatments. And by, by standardizing, by learning, by getting more efficient, by applying technology, we should actually be able to work on all of these factors actually to bring the cost down. And at the same time, with the product experience, you'll get a much better understanding where, when these therapies help and therefore drive broader access. That's what I hope will.

Thank you. And and then Mike to you, we started with you, so I'm going to give you the last word here on the, on the panel. Where, where do you, where do you kind of hope and imagine we might be in five years.

My big hope, number one is that we will not, we will move from 31 treatment to second and maybe possibly even first-line treatment. That will be unbelievable for patients who are suffering through these kind of diseases. Number two, we will be ca, less funerals and more birthday celebrations. Because and, and I believe the power of, of, of gene therapy is the future. It's going to make that a reality. I think the big thing for us to tackle, because the science is going to continue to evolve. That's without a doubt, the big thing that we're going to have to tackle is how do we improve the quality of care so that this is more digestible for patients who have to undergo this process. And I really think that that will probably get solved in the next couple of years here as the science continues to advance and more patients like my dad will be celebrating their birthdays as opposed to remembering them. Yeah.

I think that's about a perfect place to to leave us off. Thank, thank you for that. I think you're starting to accumulate quite the the quote board today we've got from, from **** to dust, we've got cancer cells, killing cancer cells. And we've got less funerals and more birthdays. And so that, I think that's just about the most inspiring note that we could we could leave off on it.

I'd like to thank the panel for all their contribution saying incredibly inspiring and hopeful and interesting. And so thank you.

Yeah, absolutely. Probably where we covered so much, so much ground, the problem, the size, the orchestration, we talked about the experience and just, you know, just listening to mike story and also took the show through.

I know I'm not the only one in this room that's probably going to say this, but I lost somebody very special to me a few years ago to a brain tumor. And just listening to this, it was, it was just a really powerful discussion. And i'm, I'm gonna go out on a limb and say, You guys are my favorite of the day.

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