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The state of Life Sciences, pt 2 - How AI relates to human life and longevity with Dr. Alex Zhavoronkov Insilico Medicine

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(00:00.748) Well just to add to that, so you know we actually at Ancylica we designed our own clothing where we show performance metrics. No way. People like to wear it. We also operate in Asia quite actively and there people actually like to pro to to demonstrate their achievements on their clothing. I I I will I will not be electing one of those for me to demonstrate my achievements to be very clear. (00:40.77) Dave Chapman. I'm Rob Kernahan. And this is Reality's Remixed, an original podcast from Capgemini.

And this week it is part two of the Life Sciences miniseries. And we're going to have a look at drug discovery, clinical development, and how it can become faster and more effective with the use of AI in the process and maybe some big thinking. Joining us as usual for the Life Sciences mini series, I'm delighted to say it's our friend Thorsten Rall, who's Life Sciences leader here at Capgemini. Torsten, how are you doing today? Perfectly fine. Great to be with you again. Great to see you, mate. And Roberto, you're here? Bonjour. How are you? I'm here. It's Friday. How are you doing? hashtag winning. Dunno. Living the dream. All of those above. Happy Friday from Robert. Happy Friday, everyone. I I'm hoping for a big conversation on this one, so looking forward to it. Let's go. Marcel's also here. Now I and I'm gonna bring Marcel in unusually because Marcel went to see the whole bloody affair this week. Marcel. Yeah, Bill Bill one and two, in one take, four and a half hours in the Now what did you make of it? Did you fall asleep? No, no. Had had many laughs with a friend. good popcorn, of course. Comedy film, Marcel, you have spotted that, right? It's kind of quite a series. There there are scenes in it where you you must laugh at it, so yeah, I just just enjoyed it for four and a half hours. Straightforward as as Tarantino meant it to be. Now here's the big question. Did you prefer it as one big tacked together film or did you prefer it as part one, part two? No, one w one combined together. Did you much better did you? Yeah, yeah, yeah, yeah. Torsten, have you seen have you seen this big kill build? I I have only seen one and two separately. I haven't seen it as one big film. And it's been a while. But I must say it's like an interesting introduction into like a life science podcast. It's kind of I don't know, Kill Bill is more like death science to to sort of. It's an interesting introduction for sure. Certainly something about life in Kill Bill, I think, somewhere. I'm I'm on record as part one and part two better, I think. Just turn they they're a bit different, aren't they? (03:05.486) Little bit different. Anyway, let's get on to our main subject of life sciences. Thorsten, remind us of what we're covering in the mini-series. Sure, we're happy to. So we're essentially going to look at the full value chain of of life sciences and how technology in AI is reshaping how work is done there, right? So we'll start with the research and development space, and that's what I'm gonna be talking about today. Super exciting because that's where On the one hand, lot of the value for the organizations in that space is being generated. But more importantly, that's actually where all the good innovations come from that are treating then our patients globally. Then we'll look into the other parts as well, for example, manufacturing supply chain, how we're seeing more resilient and also predictive supply. Looking commercial in in one of the episodes, which is around how the engagement with healthcare professionals and also with patients is changing. And how this is changing in the context of the the technology evolution that we see. I mean, everybody's talking about chatbots and agents these days, so that's gonna be quite exciting as well. We're gonna go deeper into medtech product development too, how you accelerate the development cycles, how you actually combine hardware, software, and ecosystems. And then we're gonna be closing it off with how you knit everything together in enterprise transformation and really digital core. So very exciting topics and we are starting at the beginning today with RD. And I'm delighted to say that joining us, we've got the founder and chief executive of Insilico Medicine, which is a prominent clinical stage biotech company powered by generative AI and automation. Joining us is Dr. Alex Zavaronikov. And Dr. Alex, I think it's fair to say Torsten is a true visionary in this space. not only I think on the use of AI in R and D and in pharmaceutical development, but also has a a real take on the world of pharma and is a world leading thinker and I guess researcher into human longevity. So yeah, I mean, it's

definitely a very, very exciting personality and so happy to have Alex with us today. (05:24.728) To share his perspective. He's also been in the space for quite a while. So he has really seen how AI in life sciences and in life sciences research in particular has developed over the last couple of years. And given his his deep thinking and visionary spirit, I'm very much looking forward to hearing where he sees the industry going in the next couple of years as well. Yeah, me too. Where do you stand on longevity, Robert? I plan to live forever, Dave, that's it. I'm gonna I I'm just gonna be around to to hassle Marcel. You're in your third century now, I think. Interview with a vampire, actually. The next variant is interview with an architect. Podcast. That's the variation on the film and I'm gonna be there a la Tom Cruise in that structure. Maybe it will just feel like a lifetime. Any presentation from me does feel like a couple hundred years. Yeah, that's very true. That's it, that's that's the way that you work longevity. Yeah, yeah, yeah. I I make it as ex as seem as if time has just slowing down. Slowing right down. Yeah, yeah, yeah. Seems like forever. So on that note, let's go to our conversation with Dr. Alex Zhavoronkov of Insilico Medicine. (06:44.568)

Doctor Alex, good morning. How are you today? Very well. Great to be with you today. And whereabouts in the world are you joining us from? I'm dialing from London, England. I am around Old Street, the wonderful new district which is being actively modernised. Every time I come here I am deeply enjoying myself and the area. It is a really lovely part of London. If you know listeners haven't been there, it's an area that's been thriving for about the last ten or odd years. It used to be quite an industrial area. Actually it's probably longer now. Like it a lot of bars moved in there to start with, like in into a lot of the old industrial warehouses and a lot of creative companies and things like that. And then the UK government hadn't had a I'm gonna say an attempt to create a tech sector there called the Silicon Silicon Roundabout. Remember that Robert? I d I mean you got a whole valley where you've got a roundabout. I mean I don't know what that says but Scale is different there, isn't it? Scale. Yes. It doesn't it isn't quite the wonderful vistas of Silicon Valley, is it? Silicon Roundabout doesn't conjure up the same mental images there are. It's a start, however, I mean it could be a really, really big roundabout. I mean, we've not talked about the actual size of it, but I suspect it's more modest. Yeah indeed. Anyway, Alex, why do we find you in London? What are you up to at the moment? So I'm here for many pharma meetings. However, I'm also speaking at the London Tech Week and the Founders Forum. So that's one of the events that I never miss when being invited. And I go for now I think over ten years. it's it's a phenomenal enterprise by Brent Hobberman, who brings together many entrepreneurs from around the world and you get to meet people, do business, but also deeply enjoy London. Well, very welcome. Tell us a little bit about InSilico and perhaps given Your position in the organization as as founder and chief exec. Give us a little bit of the history. So what happened on that day that you thought about Insilico? What was your motivating purpose? Sure. So Insilico is now one of the largest and most productive companies in AI-powered drug discovery. We are publicly traded on the Hong Kong Stock Exchange. We just listed under the code name 3696. Very easy to remember. And we (09:11.738) started around 2014, originally at the NVIDIA GTC conference. So we kind of started at the very dawn of the deep learning revolution. my background is in GPU computing. So I was in GPUs in very early two thousands working for ATI and then after making a little bit of money decided to switch to biotechnology and specifically focusing on aging research. So longevity is the only thing I care about, how to make people live longer and healthier lives. And when Encilico started, we realized the potential that deep learning holds for generalizing multiple patterns in biology. And we started as a company focused on a very specific part of drug discovery, which is called target discovery. So identification of those kind of molecular criminals that drive diseases and also aging. So I remember my presentation at the NVDHC very clearly. It was can NVIDIA solve aging? So back in the day. Then around 2016, we realized that actually 2015,

we realized that generative adversarial networks, kind of a form of AI imagination. Hold significant potential in generating new objects from data, new structures, and decided to apply it to both biology and chemistry. So creating both synthetic data with the desired properties, synthetic biological data, and also new molecular structures with the desired properties. So think of it as instead of trying to find a molecule that kind of disables the criminal. driving the disease using trial and error, basically going and trying to search for a needle in a haystack. So we we realized that generative adversarial networks hold massive potential in generation of novel synthetic objects with the desired properties and we started applying them to biology generation of the specific biological data sets with the desired properties (11:34.124) I'll give you an example. For example, we can take your biological data set like a blood test today and move you into the future twenty years out in terms of your age and say, well, generate the same blood test, but twenty years later. How's it gonna look like? So we can create billions of you with you know one year one month increments. Please don't create billions of Rob. What one is That's really cool though. So you can model me out twenty years from now and I'll be a a heap on the floor unable to function as a human, but at least we'll be able to create a model around it. So I remember it like yesterday. And we also realized that GANs and other forms of generative algorithms can be used to generate molecules with the desired properties. So for example, if you want to identify a molecule that inhibits, disables that molecular criminal that is driving the disease binds to that specific protein target, you can now imagine it using AI. So instead of trying many, many molecules and looking for a needle in a haystack. You can generate a few perfect needles, synthesize them and test. And those perfect needles don't exist in nature. So 2016 was our first paper on that. And since then we have just advanced of course technology has evolved quite dramatically over the past ten years, but the idea remained the same. So identify the molecular criminal that is driving diseases, but also aging. there are many of them, and then create new molecules that would make perfect drugs that are both safe and effective and commercially tractable and then synthesize them and test. So so far we over o only the past five years we kind of took the risk ourselves and decided to apply those algorithms to our own drug discovery programs. (13:47.016) And we were surprised how well and how quickly we could ramp up in real drug discovery. So we've nominated thirty developmental candidates since 2021, so just last five years. Developmental candidate is just one step before clinical trials. And so you just do one formal experiment called IND enabling studies, test safety in regulated manner. And then you can start human clinical trials. So in the life of a medicinal chemist, usually the the nomination of a developmental candidate is a big event. Usually they nominate like five, six, maybe seven in their entire lifetime, in their entire career, and very rarely they reach clean human clinical stage. So thirty is a big number. And now we've got thirteen clinical and three phase twos and one phase two complete. So that's Massive productivity. We also sold a bunch to pharmaceutical companies, so they're of ultra high quality. And before we before we go much further into that though, and I w I want to return to R D in a second and maybe go a little deeper on the use of technology in R D today. Well before we do that, there's couple of things in the history of the company there that I thought might be interesting just drawing out a little bit. The first one is the nature of longevity and what you're talking about. It's become a little bit more of a mainstream conversation at the moment, I think, because of Brian Johnson on Netflix. And I wonder what your take on that situation actually is. Is is what he's doing v a viable way to look at longevity, do you think? Or is there a is there a is there a better way to go about looking at it in the way that you describe? So unlike many other aging research scientists Who are kind of purists and more academic. I am very much in favor of Brian Johnson. I think what he is doing is valuable and maybe not for academic science or industrial biotechnology, but for general awareness that people need to pay attention to how long they're gonna live and not to things that they don't need. (16:07.704) That they spend a lot of time working for to to to basically earn some points to get you know fancy stuff that they don't really need. I think that Brian is a

Kardashian of longevity, quote unquote. Excellent. So he is an entertainer in a but but also a very useful one because he brings attention to this industry and kids who watch his entertaining kind of reality show. I think that they are more likely to develop into scientists or adventurous entrepreneurs who will go into life extension instead of going into TikTok and you know producing fun videos people don't really need. The reality of life is that and you can ask any large language model today, so any favorite chat bot you fa fancy. Will tell you that there is no drug outside of anti infectives and vaccines that can help an already optimized person who is doing what I like to call DYMT, what your mother told you diet, exercise, sleep, meditate, don't overstress, avoid accidents and get diagnostics. I was peak at eight years old. I got a good night's sleep, I ate healthily, I didn't drink alcohol. I think that was my peak. About that. When I hit ten it all went downhill from then. I think that's the that's the key, isn't it? We get corrupted as we get into adulthood in many ways, isn't it, with lifestyle and everything else? It's the Yeah, but now imagine that you are living a life of Brian Johnson, so optimizing, etcetera. Right now there is no drug that I know of or the LLMs know of that can give you additional two years. So that is a scary situation because basically you can convert time into money, but you don't have the tools to convert money into time. Just think about that. So you will waste an hour on this podcast or like half an hour. What some would some would say waste. Well, wait a second, right? So let me explain. So you have wasted it if you have not acted on it. But it probably may give you (18:31.786) A few minutes of healthy productive life if you follow some of my insights. Like for example, if you just increase your level of optimism and reduce your psychological age, quote unquote. So by believing that you're gonna live longer than your current longevity expectations, you actually are likely to act as a younger individual and you might be able to live a little bit longer too. So my advice is that You know, whatever you do right now, there are no drugs that can significantly extend your life, but your attitude to life and your longevity expectations can. And I published a few papers on that. And actually that's what Brian Johnson is useful for as well, because he adds a certain optimistic note to our longevity. So when he's talking about I'm I'm sort of not even joking here, he's got like different biological ages for different Aspects of his body is like different organs and things like that. Is that true science, Alex, or is that a bit of showmanship? Well, before I answer, I challenge you to do something for me and everybody on the Pat podcast. You you can go to your favorite chatbot and ask a question. Who is number one in the world in AI for longevity? And when you get the answer, my answer may seem a little bit more credible. And I can tell you that at this point in time, we have many, many, many tools that allow you to measure aging and get insights into how you age, but there are virtually no tools for a very well optimized and diagnosed individual to significantly reverse many of those tool or many of those clocks. So, whatever is Bryan is doing is of course a combination of showmanship. It's very valuable data generation. So, in the case that he passes away, there will be very significant data legacy, as I call it, to be passed along to his kids, and hopefully the rest of us and many people around the world will pass away without leaving that legacy, unfortunately. and that legacy is very valuable. (20:53.528) However, if you look at the current toolkit that we have for extending life using pharmaceutical means, we currently do not have anything that can give you additional two years of life. I think that GLP ones are the f those famous Azempics and Manjaros that people inject at scale. Now nowadays more Manjaro than Azempic, but both are good for losing wait. Well I I must confirm that I'm on GLP1s right now. I'm microdosing, even though I'm a very well optimized individual. I think that if those drugs get into the population and people who are already optimizing start using them, they may get may get additional you know year, maybe year and a half of to their life expect expect expectancy, but it's not gonna be a miracle. And Currently I'm not aware of any drug that would significantly extend life of human beings and reverse aging clocks. So optimization in your mind at the moment is still predominantly about mindset and behaviours, or did I misunderstand that? Well, I think that what can give you the most right now in terms of living longer and acting younger, that is your psychology. And

of course, for for for for a person who is already optimizing you know dieting, not overeating, sleeping well, no stress, diagnosis procedures, and no bad behavior is such as smoking or drinking, or god forbid, drug addiction. So I think that There are very few options that we have right now, and that's why in Silica exists. So we are basically humanity's one of the humanity's few hopes, because mo most of my drugs in the pipeline, they have dual purpose. If they get approved for a disease, we'll be able to study them for aging, because the original hypothesis came from aging research research. And that's gonna be a long journey. Don't expect miracles. (23:12.652) We also might might fail. I hope we don't and I I I don't think we will. But even if all my drugs get approved and re get repurposed for aging, you might expect ten years to healthy life. By the way, that's a huge number. So currently there is no drug that can give you two. Let's use that as a useful pivot into into R and D and the use of the evolution of the use of tech in in R and D. Maybe set the scene for us a little bit. In terms of the use of modern tech like AI, like life sciences and R and D, in particular in life sciences, are a very early adopter of this technology. And it's not just over the last couple of years, it's over the last ten or twenty years, I think. So what what's the journey to date with it in in life sciences, R and D? And what what sort of genuine changes have you seen come about as a result of using it? Sure. So first of all, AI in drug discovery and development is not a new concept. It's been around for a while in you know, even pre-deep learning days. But the real several revolutions that transformed the industry and are transforming and accelerating the change right now came with deep learning advances in 2013, 2014. So after deep neural networks started outperforming humans in image recognition, voice recognition. Text recognition, people started noticing and doing many pilots. So we started around the same time, and every pharma did a pilot with us, almost. Then it progressed to more application-based projects. So generative algorithms came about, generative adversarial networks. you probably remember the time when we started creating butterflies with more wings than usual, or flowers with more petals. We did the same for molecules. Again, early days. 2017 was the major breakthrough year when transformers were published. And that's kind of the birth of the modern GPTs and other large language models that are truly transforming the world of everything, including drug discovery and development. And we've seen massive acceleration in computing capacity that also enabled physics-based models. (25:34.826) including many of ours to advance to the level of speed where you don't need to wait for a week to get a response for molecular dynamics simulations. So around 2022 when ChatGPT was published, many people in drug discovery were already using AI at scale to discover and develop drugs. We already had more than fifteen programs by twenty two out of generative In 2019, we published a very powerful paper called Generative Tensorial Reinforcement Learning and synthesized the first molecule coming out of that algorithm that was tested in mice. The entire process took 46 days. So many people remember that as a breakthrough moment for our industry. But the reality of life has changed in a very profound and dramatic way when GPTs started propagating into the business. So and started being deployed organization wide. So now with the latest frontier large language models from all the large model frontier modeling houses, the real superpower is the ability to reason across many disciplines, programs, therapeutic programs, and another huge advance that just transpired a few months ago, so it's not hasn't been a year, is open claw. So open claw concept where you can orchestrate agents, complete or get the tasks to completion and have short-term, long-term memory, dramatically tr transformed the industry, including our company. So now you could you can orchestrate many smaller models and even people. People can be now orchestrated as agents by AI. To get very grand tasks to completion. Now I see the glimpse of my vision from two thousand sixteen of a prompt to drug where you can basically describe what you what problem you want to solve and you are gonna get a drug synthesized and tested with minimum or no human intervention. When you look at that quite radical change in the sort of the way drugs are developed, the life science industry is (28:00.376) very heavily regulated for very good reason as it impacts humans. Where are you on the sort of regulatory

framework around being able to keep up with this type of change of like prompt to drug highly automated, etc.? Are they keeping pace with it or are they struggling a little bit to keep up with what the technology can do versus what the regulation tells you you need to do for the checks and balances in the system? I have to be very careful with what I say here, because we have thirteen drugs clinical side, and that's the very regulated area where you have to move with the speed of traffic. As an AI company, usually you have to be even more careful, because the regulators would scrutinize you even more. So regulations are there for a reason. And you can be a super optimist about your drug. You might have total confidence in the AI generated molecule before you see dogs die at very low dose. so you have to go and e and and develop enough experience within the organization and also within the industry to ensure that when you s you get the molecule out and synthesize it, it's already super safe and preferably effective at any reasonable dose. So regulation is there for a reason. I think that the regulators are still struggling To grasp with the current power of AI. And it's not only the regulation, it's even internal compliance. So before in Silico, I could actually, you know, come up with a drug or repurposing candidate and test it on myself. I cannot confirm or deny if I have ever done that or at scale. So Brian Johnson had a good good pre precursor, most likely, like with real drugs. but right now you cannot do that because every human subject in a trial needs to be reported to the regulators. So even if you want to go creative in any way and use your own subject as an experimental organism, you can't. And that is a little bit jarring, and many of us in the field are unhappy, but at the same time I can tell you that after you get (30:27.552) Several years of experience being an AI company going into hardcore drug discovery, you realize that regulations are there for a very good reason. And for the next five, ten years, you should not expect miracles because we need to establish a body of evidence demonstrating consistent safety and consistent efficacy out of AI. get this evidence in front of the regulators and then change. So when you describe that startling idea that you can describe a problem and ultimately you will get a a drug related solution to that problem, what kind of time frame in your mind are we talking about there? So I think in the ideal world, if we had the ability to go from zero to the drug delivered to the patient, skipping all the regulatory requirements and directly dosing, I think that it would still take a few months just because of the operational and developmental steps that you would need to take. Because you would need to make the molecule. If it's a small molecule, it would take you at least a month to scale up chemical synthesis. And then you need to get what we like to call API and CMC, so you need to get the formulation right. So you need to get the spill and then give it to the patient. So it would take a few weeks if you skip all the tests. And when do you think that kind of capability will be on the market? Are we talking Ten years out, twenty years out from now. You know, I'm actually thinking right now that we probably have this capability. So if I had a rare cancer today and that would be my kind of end game as Alex, I would probably go for something like that and and try that within weeks. Wow. I mean if you think about the incredible change, there's a huge potential in the system. (32:38.83) For what we could use this technology for? Is it that just it's j what feels like it's holding us back is the mobilization, the organization's creating the construct that allows us to do that. So what you're describing there is incredible and it's just we just need to get to implementation. It feels like you're basically saying the technology exists to do this. We just need to change the way work gets done, which is essentially what AI is doing and things like OpenClaw, et cetera, is we're redefining that how we create the outcome. Have I got that right? So so correct. But at the same time, what I'm actually advocating for is keeping the regulation as it as is for a while, because currently the regulation is such that the regulatory environment is such that regardless of how you discover the drug, you can use a genie in the bottle, you can use magic, you can use many years of laboratory science, but you need to go through the same steps regardless of how you discover the drug. And if we demonstrate several times over that consistently we do not fail and we can produce safe and effective molecules and recursively improve. So self-improve at every step, I think that then we

can go to the regulators and also to the general public and even to our convince ourselves that this technology is safe. So I don't think we are there yet with the body of evidence that we can get there many times over without failing. We we demonstrated several times that we can get there without failing with very specific therapeutic modalities and something that has like is not d dramatically different from what was done before. I think we need to do this many times over in order to make drug discovery faster and cheaper. And I would say significantly cheaper, because if you could skip all those that all those steps, we're talking about Thousands of times reduction in the cost of healthcare, the cost of pharmaceuticals. Torsten, when when you're hearing this and you spend a lot of time right across the life sciences sector, the level of advancement here is this is this typical of the conversation that's going on across life sciences, or is this is this kind of an accelerating aspect of what's possible with the use of AI under under life sciences R D? So I think (35:02.636) Generally, when you look at across the industry, there is a recognition and realization over the last couple of years, and Alex alluded to that, that the power of the technology is really, really shaping and changing how RD is done and has the potential how RD is done. I think we've seen a a longer period of time where there was, I would say, the famous proof is in the of the pudding is in the eating, right? So some people saying, yes, that's gonna be the future, others saying Science is too complex, you won't be able to solve that with with modeling. I think that question has been answered by now. You of course from from a big pharma perspective, there is there is a big emphasis on like taking the pace at the right time, right? I mean Alex alluded to that. You as a smaller company, you cannot really go ahead of yourself. But as like a big pharma company, you don't want to be the one that is like overstepping in in in the acceleration, right? I know that In the public discourse, there's often a lot of questions: why are things taking so long in pharma? Why is it not faster if all the technology is there? But in the end of the day, you're still dealing with people's lives. That has to be crystal clear. And I think what is also important, and Alex, you you mentioned the the public public perception is like painting the the balanced picture here because yes, it's a lot of promise. But in the end, you also have to be clear on what is validated to a level of to gr to a degree that it's really ready to be fully implemented by the regulator. and so generally perception is the promise is is immense. I think I mean in Silico is one of the companies that has actually really proven the the acceleration potential and kind of like took that question mark off the table, if I may say so. And now you see a general general acceleration. But that brings me to to one question, Alex, because what do you see the role of pharma in that future play? And I know that in silico you have like two ways of working. You're essentially doing your own research and then selling out or licensing out your your molecules. You're also working directly with pharma companies in the research space itself. So how do you see that model evolve in the in the future? Is the verdict still out? Is it gonna be one or the other? So (37:20.246) I actually would leave the answer to you because you are Cap Gemini, you know better. Well, that's why we need companies like yours to actually navigate this industry. And we need to ensure that this kind of advice that pharma gets from you is also very honest and also maybe propagating to the investors, not only to pharma directly. Because currently for many pharmaceutical companies are so unproductive. I I cannot point fingers at this point in time, but typical biotechnology company in China would be, I would say, seven times more productive than a big pharmaceutical company moving at the current speed and at their top speed. So and I'm talking about moderate to high novelty sp space where we're talking about reasonably novel drugs. But some pharma companies are more productive than the others. So we also see that you know, for example, LA Lilly, they are innovating at the speed where even ourselves, so I'm looking at myself and I'm thinking, wow, I'm slow and I'm lacking scale. Of course they have the resources to do that, but it's also many other f pharma companies do. it's just in some areas of AI they're better than us. And They also utilize very specific resources that allow them to accelerate, including partnerships. Some pharma companies may tell you beautiful stories that they're using AI, it's accelerating RD at every step of the way. Those are

typical stories, but they don't have the benchmarks. And what we need, what the industry needs the most, is a set of RD productivity benchmarks where the talk is cheap. But show me the number of developmental candidates you've developed over a certain period of time. Show me the number of the the time it takes from zero to developmental candidate, how long does it take? What is the novelty of your target? Is it an incremental innovation where you just took an existing target or something similar around the existing target and went with just a new therapeutic modality, or is it a genuine new invention? Also, can you scale? (39:40.958) Can you go beyond several drugs? Can you do 10, 15, 20? How many can you do a year? And finally, what is the quality and outcome of your work? Did you license this drug to somebody else? That they are were they willing to pay for it? Or did it progress into the next stage of human clinical trials? How did it perform? So let me just finish here. So I think that it's very important to have this set of benchmarks instead of just vague talk. And that's why we need to ensure that they disclose earlier. And once you see the skeletons, you understand that okay, well, this one's faking it, and it's a completely boring pharma that is basically sitting on the revenue stream from already approved drugs and just misusing the funds for unproductive RD or Is it the genuinely effective and productive RD enterprise that requires more fuel? So I think if we had those benchmarks properly presented and used industry-wide, we would be in a very different situation. Currently, pharmaceutical companies are much better than us on clinical development. Whoever tells you that if an AI startup comes out and says, we are gonna dramatically disrupt pharma in clinical development and we are better than them. They are either lying through their teeth or they don't they don't know the industry. Because the principal investigators at hospitals, they would much rather work with a large pharma company. The regulators are more eager to speak to the large pharmaceutical companies. And even the patients would rather follow a very branded study pop run by one of the large pharmaceutical companies rather than, you know, trust a startup. So I think that and of course they there they they have all the tools to process the clinical data and on the clinical side they have years of experience. So I think that pharmaceutical companies over time should focus on clinical development, how to properly run clinical studies and also how to do marketing and sales of therapeutics, work with the payers closer to reduce the cost of cost to the patient at the end and make access (41:58.87) more equitable, but on the R and D side, I think companies like ours should start dominating. (42:13.846) Now we end every episode of this podcast by asking our guests what they're excited about doing next. Now that might be something in their personal life or something in their professional life, or maybe a little bit of both. So Dr. Alex, what are you excited about doing next? I think that the future of AI and AI powered drug discovery belongs to kind of three major forces. So one is capital, another one is infrastructure. And a third one is great ideas and intent. Everything else will be facilitated and glued by AI. So my dream within the next couple years is to approach sustainable profitability at Ancilico. So imagine the world where you have an AI company, really frontier AI company, that is helping others train AI models and producing frontier AI technology. And at the same time produces really amazing drugs at scale. So usually in both categories, you've got deeply unprofitable companies that burn a lot of cash. So I want to create a very sustainable model where I can utilize my Frontier AI to generate really great drugs and license them to pharma at scale. So as we scale, we start getting more milestones and royalties, and that will create a sustainable revenue stream that I can reinvest back into RD. So basically creating the new type of pharma. I think we're close to that point. So in the case that you kind of see us at some point in time signaling profitability, that will be the breaking point for the industry. That will be the real delta. Second thing that I want to focus on is infrastructure. Infrastructure takes time to build And that is something that AI cannot do very quickly. So you really need to have the labs, the monkeys, the the dogs, and of course the humans to be able to test the products of AI. I think for the next foreseeable future, for the next ten years, we will have to test because biology is so complex, chemistry is so complex, and the combination is even more complex. Even if you

had an AI genie. (44:35.206) a small mini god in a box that you rub and produce really perfect drugs, just making them and testing them and pr getting them to to the patients require infrastructure. So we're building that infrastructure, we're building robotics labs, and now we're even contributing to the design of a new city where you can live, work productively, get treated, and it will not let you die of something stupid. Imagine that the kind of Brian Johnson's perfect vivarium, where you don't need to leave that paradise, so you also live a nice life. And of course, great ideas. So we are now working in pretty much every therapeutic area that contributes to extension of human longevity. And we are taking more and more ventureless paths where the payout from the bet is dramatically greater than the investment. Think about GLP1. type of drugs that can be converted into lifestyle therapeutics. So that's what I'm going to be doing next. That's what I'm focusing on. And that's what I want to spend the rest of my life doing. Well, we can only wish you luck with such a enormous endeavor. (45:55.246) Yeah, yeah, pa paradise it where I can live forever. This place where I can experience paradise and live for it. I'm in. I'm in. I mean it's a compelling, it's a compelling value compelling value. It's good value prop, isn't it? It's two thousand twenty eight, Q three, so you can move in. You can buy an apartment there now. Doctor Alex, look, thank you so much for spending some time with us this morning and sharing some insight into a very different world and a and a world where AI is being used in a way that we haven't talked about on the show before. So thank you so much. Thanks so much.

If you would like to discuss any of the issues on this week's show and how they might impact you and your business, please get in touch with us at realitiesremixed@capgemini.com. We are on LinkedIn and we'd love to hear from you, so feel free to connect and DM if you have questions for the show to tackle. And of course, please rate and subscribe to our podcast. It really helps us improve the show. A huge thanks to Dr. Alex, our sound and editing wizards Ben and Louie, our producer Marcel, Thorsten, and of course all our listeners. See you in another reality podcast.

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