MILKEN INSTITUTE

CONVERSATIONS WITH MIKE MILKEN

Vivek Ramaswamy

Founder and CEO, Roivant Sciences

May 1, 2020

Mike Milken: Vivek, good morning and thank you for joining us.

Vivek Ramaswamy: Good morning, Mike.

Let's start by talking about Roivant sciences. The company is only six years old. What was your initial mission?

The mission on day one was to take aim at the time and cost of developing new medicines. It took 10 to 12 years on average to develop a medicine and a couple of billion dollars along the way. And so the purpose of Roivant was to address the manmade obstacles that contributed to that lengthy process while still tackling the scientific obstacles just like any other biotech company.

Now you were 28 years old when you launched the company. Did you get a lot of resistance to these ideas? How were you able to establish credibility?

I was a biotech investor for seven years and then left that to start a pharma company without having any primary experience developing drugs – only, at most, investing in other companies that were doing the same. So I think part of the skepticism was, how are you going to try and accomplish the same thing that has been the mantra of the

---

This interview has been lightly edited for clarity and readability.

biopharma industry over the last 10 years to shorten the drug development process and to reduce the cost of that process? And I think it was understandable.

One of the things that I did early on was to recruit some of the top drug developers that I had met, that I had come across in my career as an investor, to actually join me in this mission. I figured it was a good way – that if they were going to join me, that would help make me successful and if they weren't going to join me and they thought I was crazy, I wanted to hear that, too.

"Seeing my own family members in New York go through what they're going through has really brought us particularly close to this disease. ... It's something that's not only turned our personal life upside down, but also ... the near-term priorities of our company to help do our part in addressing this pandemic as well."

How did you get people to invest in a 28 year old initially? Let's talk about the initial capital.

There's three ingredients to building a biotech company. There's people, there's drugs, but third, there is – importantly – capital. First it came from investors. I raised money from my former employer. When I told them I wanted to leave, their first ask was whether they could invest in the new company. So that made for an amicable departure. They trusted me after I think working together for a long time, so I had a head start in that respect.

But more generally I had both an ambition for using my fresh perspective from the outside to really do things differently, which I think many investors had an interest in, but at the same time I was, and remain, humble about the fact that I haven't done it before. I think the fact that I was able to build a team of people who included not just iconoclastic contrarian visionaries, and I certainly would call myself a contrarian in that respect, I also had people who had a track record of actually getting it done, working hand in hand together. I think that was kind of the unique combination that Roivant brought to the table in early 2014.

As you know, in my life, I've really focused on the individuals as the primary asset of the company. And what struck me was your ability not only to have vision and talent, but to be able to recruit senior people to join you in bringing capital. Let's talk about more about your mission. Yes, we can take sequencing the human genome from more than a decade and billions down to less than a day and a few hundred dollars. But can we suppress the time it takes to bring a new drug to market, and the cost, by using technology, combining clinical data and biological data, to shorten the period of time? And that, as you've said, is your mission. Let's get specific and talk about how you can do that.

First would be how you can use technology to more effectively conduct research – the research of discovering new medicines. Today we can do something that we couldn't do effectively 30 years ago, which is to design drugs on purpose. To design drugs intentionally. There were these small molecules, these chemicals, millions of them that you test and some thousands of them would bind to a biological target of interest and you'd say, hey, maybe that ends up being a drug. That was generation 1.

Gen 2 was the advent of the biotech industry over the course of the late '80s and '90s which said, rather than doing this with libraries of these small chemical molecules, let's instead copy the body itself. Let's harness cells, let's harness the biological processes of cells, to create targeted therapies, therapies that were intentionally made, on purpose, to bind to a specific biological target. That led to the boom of the biotech industry around things like monoclonal antibodies or today gene therapies that harness natural processes to actually produce a novel type of medicine called biologics.

Where we are today is, the way I think about it as generation 3, going back to those small molecules, but now harnessing AI, machine learning and computational power to intentionally design not just biologics but actually small molecules and chemicals from scratch that are synthesized in the lab. These were the kind that sat on the chemical libraries and shelves of pharmaceutical companies and chemicals companies over the course of the last century, but today they're able to be designed from scratch in much the same way that Gen 2 – which was the biotech industry – harnessed nature to develop targeted therapies in their own right.

"[My wife] had a C-section but went back at four weeks exactly – went back to the hospital to serve on the frontlines along with her colleagues. … A little over a week ago, she tested positive"

So let's take a look at a real-life example. Why don't we touch base on Alzheimer's, for example, and what your experience was there. Your mother was a psychiatrist in Cincinnati and – before we knew it was Alzheimer's – was treating many senior citizens with that type of affliction.

I think one of the things that makes Alzheimer's disease difficult, even more difficult than COVID-19, is that we don't know the biological root cause of the disease. We don't understand exactly what is the, what we call pathophysiology of the disease. And so this is part of the reason why we haven't seen a successful Alzheimer's medicine developed. The best we were left with here was looking at what kinds of drugs could actually affect the levels of certain neurotransmitters in the brain, with the hope that that might have a discursive impact on the course of the disease itself, if not at least the symptoms and management of these patients.

One of the things we knew from the first generation of Alzheimer's drugs that were approved is that there's a neurotransmitter called acetylcholine, where if there's a higher level of acetylcholine in the synapse, patients tended to have higher cognition and higher function. That led to at least a better quality of life for patients who were in the nursing home – exactly the kinds of patients that my mother took care of. So when I got Roivant off the ground, one of the early projects that we pursued was a therapy that had been through partial state of development that worked on a different mechanism of action but with the same end goal of increasing the amount of acetylcholine in the synapse. And the short answer was, the drug – while it had a biologically plausible hypothesis and some early supportive clinical data – it was uncertain whether it was going to succeed or not. We got a team of developers, including the prior developer of Aricept, the most widely used Alzheimer's drug, to head up a team that ultimately answered a question. That's the goal of every clinical trial, to answer whether the drug works or not. And one of the things that was a good, even if humbling, experience for me early on was to see that drug be tested in a phase 3 study, go through all of the steps needed to evaluate whether it worked, and then to discover that indeed the drug did not show an effect relative to placebo, which is the direction that so many Alzheimer's drugs have gone over the course of the last couple of decades.

"Once you have a clear genetic sequence of the virus, once you have a clear understanding of the molecular structure of the virus, that then lends itself to rapidly develop drugs for those specific viral targets, or even drugs for host targets when we better understand how the virus interacts with human beings."

So to me there was a lesson in there which was that drug development is, especially if you embark on this project of shortening the time and cost of drug development, is probably best done in the areas where we have a real understanding of the underlying biology of the disease because then we can deploy those modern tools that we described earlier to design drugs intentionally rather than empirically. Much of what we have done since then as a company has been centered exactly around such projects. Unfortunately, Alzheimer's disease still isn't on that list, but I think that both the public sector and private sector are racing to advance that understanding as we speak.

The flip side is, when we bring it back to something like an epidemic like COVID-19, I think once you have a clear genetic sequence of the virus, once you have a clear understanding of the molecular structure of the virus, that then lends itself to rapidly develop drugs for those specific viral targets, or even drugs for host targets when we better understand how the virus interacts with human beings. We can much more rapidly iterate on the development of vaccines or therapeutics than in the case of an Alzheimer's disease where we know very little about the underlying biology. So

companies like those who have developed vaccines, as well as companies like our own that have been able to rapidly put medicines into development for addressing the consequences of COVID- 19 infection, put us in a much better place in an area like infectious diseases than we might be in an area like neurodegenerative disease.

You head out on a path, and then life gets in the way. With COVID-19, because your family is so involved in medical medical care, it has affected your family. Let's start with the birth of your first son, Karthik.

Well, it's like you said, Mike, things don't always go as you expected. This wasn't how we expected our 2020 to look as a family. We had the birth of Karthik, our son in late February. He was thankfully born healthy approximately on his due date. We were in New York City and COVID-19 hit.

And when COVID-19 hit, my wife had a deep, personal conflict, where she wanted to spend her planned maternity leave with our new son, but at the same time, we were seeing New York City's hospitals beginning to be overrun. She heard from our colleagues what they were seeing in the hospital. It sounded like it was going to be unprecedented. Eventually it was, and so she eventually I think felt a sense of duty to just cut her maternity leave short. She had a C-section but went back at four weeks exactly – went back to the hospital to serve on the frontlines along with her colleagues.

But that required us to make a very difficult decision as a family at home as well, where Karthik and I had to then sequester away from Apoorva. So we're now in Ohio where we have been stationed indefinitely since then. We have a home here and it's also where I grew up. It's always been home for me. But it's been difficult to be here without his mother, especially as she's been on the front lines of New York City's hospitals.

And to make matters a little more difficult, a little over a week ago, she tested positive. It's not entirely surprising. It was the very reason why we took the precautions we did, but it was a reminder of the risks that not only she but people like her in New York City and across the country are taking every day in being the frontline responders to this unprecedented pandemic for a virus that's as infectious as we've ever seen.

I have to say I admire her father who did the same thing, even though it's outside his specialty. He volunteered in various ways. He had been going into the hospital regularly and he too tested positive around the same timeframe. And so we're rooting for their rapid recovery. I'm sure they're going to get through it in good health. I have confidence in that.

It's funny because things come full circle. We had a drug in our own pipeline which was being developed for severe COVID-19 patients. I would say the combination of not only developing that medicine but seeing my own family members in New York go through

what they're going through has really brought us particularly close to this disease. We're talking about their experience personally in informing the way that I'm thinking about what we can do as a company to address not only the treatment of the disease but potentially the development of other technology to better exchange information about patients undergoing care for the disease. We as a company – here from a bedroom in Ohio – have been managing a company remotely to develop a medicine, to have developed a piece of technology that's now an open platform for building a COVID-19 patient registry to help researchers in the United States exchange information about COVID-19 patients more easily. It's something that's not only turned our personal life upside down, but also has turned upside down a bit the near-term priorities of our company to help do our part in addressing this pandemic as well. It's like you said, things don't always go as you expected, but you rise to the occasion in the best way you can.

One of the things in our interaction together over this period of time at *FasterCures* has been your focus on certain areas. The paper you wrote, the path to normalcy, was an important paper that we shared with our advisory groups of *FasterCures* a number of months ago, and your thought-provoking op-ed [paywall] on stakeholder capitalism. What were you hoping to achieve with that op-ed? What were the ideas you were hoping to put forth?

Yeah, sure. Mike. I think the idea that I wanted to take up in that op-ed was really the question of how companies can make their most meaningful contributions to society. Following the 2008 financial crisis, I think there are a lot of jaded attitudes with respect to capitalism from the American public, understandably so. But one of the things that I had seen over the last 10 years was a trend of companies towards espousing social values – including values of social responsibility, laudable values – but values that I thought were better reserved for the democratic sphere of our society, for our citizenry to decide upon, on issues ranging from environmentalism to labor matters to diversity in the workplace.

I wrote this before the COVID-19 pandemic had really hit us hard – the op-ed was published in I think in early February. But I'm reminded of its message now as well when the thing we want from the biopharma industry is not – even in companies like ours – is not the promulgation of some social value, but we want a socially valuable outcome in terms of developing medicines, cures and vaccines to protect us from this pandemic. That is what companies have to offer.

"Like we saw in the rollout of testing during the early phase of this pandemic, we might be better off reserving innovation and the development of new technology to the private sector. I think about it as a sort of division of responsibility between the public and private spheres of our society"

Like we saw in the rollout of testing during the early phase of this pandemic, we might be better off reserving innovation and the development of new technology to the private sector. I think about it as a sort of division of responsibility between the public and private spheres of our society, each of whom have something important to contribute and wondering whether everyone might be best off if we actually were most lucid about that along the way.

I want to wish your entire family good health and safety and, particularly, I look forward to you leading the way to find a way to shorten the period of time that it takes to bring solutions to life-threatening diseases in the future. All the best.

Thank you, Mike.
