# Audio file

[Moderna and Flagship Pioneering Noubar Afeyan.mp3](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

# [Transcript](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:02 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The reality is when you have a pandemic and you're a public company and you've got material data, our sense was that we at least needed to at a high level put that out there. So in May we indeed did come out and say at a very high level that we had some encouraging results and people attacked us every which way.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:18 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Alright.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:22 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[For having said that, because they basically said, well, that's doing science by press release and and so one of the things we learned because none of us have been in.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:31 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[This situation before.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:33 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Was that we were going to get criticized no matter what we did.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:39 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[From NPR, it's how I built this a show about innovators, entrepreneurs, idealists and stories behind the movements that they built.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:00:53 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I'm Guy Raz, and on the show today, a new bar of fans understanding of risk led to a life saving vaccine and to the spectacular rise of Moderna. Now one of the biggest biotech companies in the world.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:01:11 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Innovation and risk are inextricably linked. You can't innovate without taking a risk. The calculation any entrepreneur has to make, of course, is how much of A risk to take. One of the greatest risk takers in American history was Thomas Edison.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:01:29 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[His team of engineers invented the light bulb, the phonograph, the motion picture Camera and Edison held more than 1000 patents. But to create these world changing inventions, Edison's team had to fail more than it succeeded. Edison famously once said I have not failed.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:01:49 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[10,000 times.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:01:50 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I've successfully found 10,000 ways that will not work. It's why we don't talk about Edisons talking doll or his electric pen, or the Electrographic vote recorder. Because despite massive investments of time and capital, those ideas failed. But the risk was necessary.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:02:10 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Harry and those failures often led Edison's engineers down paths that would lead to totally different ideas. It's an approach that's helped to make flagship pioneering among the most successful biotech venture firms in the world. And let me just pause to explain all this for a moment because this episode.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:02:31 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Is largely about the founding of Moderna and the man behind it, Yubara fan.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:02:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Moderna as many of you know, created one of the major and most important COVID maccini. Yes, but Moderna the company came out of that larger organization called Flagship Nubra Fan founded flagship pioneering back in 1999 and the idea was to do three things.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:02:57 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[All under one roof, the 1st to raise lots of money to invest in innovative biotech and life sciences.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:03:05 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Users, the second to identify promising researchers and help to incubate new companies, and the 3rd to help manage and grow those companies flagship pioneering has incubated more than 100 companies. Some of them are no longer operating, but many are thriving including best known.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:03:26 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Madonna.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:03:27 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Maderna was founded in 2010, and it's already 1 of the largest biotech companies on Earth. Much of that success, of course, has to do with the breakthrough technology that led to the COVID vaccine. But Maderna didn't intend to become a vaccine maker. In fact, in December of 2020.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:03:47 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It was not equipped to mass produce vaccines.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:03:51 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[But the company had already spent billions of dollars on research around a new type of technology using M RNA molecules, and it just so happened that because of the research, Moderna had been doing, it was perfectly placed to come up with a vaccine to fight the coronavirus. The story of how Nubar helped to build.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:04:11 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Moderna is also the story of how he co-founded dozens of other innovative biotech companies and the huge risks he took along the way.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:04:20 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Neymar was born in Beirut in Lebanon. Both of his parents are Armenian by descent. His father had a thriving business importing plastics in Beirut. His mother was a trained concert pianist, but by 1975 sectarian violence had broken out in Lebanon and the country was soon to be engulfed in a long.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:04:41 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Civil war. I remember a couple of events. Among the most stunning 1 was waking up at 5:00 in the morning with a gigantic explosion, which was a.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:04:50 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A building a rather large building, maybe a block away from us that was completely leveled and you know with with lots of dead people and and just it was just like for a 12 year old at the time that was very shocking. But then when the war actually so we were actually broke out, we we stopped going to school. So from the beginning of 75 till probably May, June.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:05:11 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[We were at home. We would have sirens going off. We would go into the basements quite routinely. We had a ping pong table in the basement, so that was kind of a redeeming feature and that we could play ping pong while we were meant to stay in these kind of underground area.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:05:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You know, there was, we would watch from our vantage point probably, you know, one or two kilometers from where we were maybe 1 kilometer, lots of rocket fire back and forth, you know, buildings being blown up and this was this went on for months and months. And of course after we left, it went on for years.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:05:44 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah. And I know I know nobody that your dad had this thriving business. You he wouldn't put plastic products into Beirut.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:05:54 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[But I guess around this time in 1975, you were about 13, the family your family left you. You fled from Lebanon to to Montreal and Canada. That is a, you know, that's a was a some of the huge kind of risky decision.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:09 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[For your, certainly for your dad. So what? What did he do when you got to Montreal? Like and. And what did the family leave behind?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:15 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So we left the apartment we owned. We left all of the warehouses of of of inventory. He had just left it completely and he actually he went back for the first time eight years later to actually liquidate what he could. But anyway, so. So when he came to Montreal, interestingly, he did not want to do the same thing.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:23 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Is left in Lebanon.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:35 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So he really wanted to get into the production of something he really wanted to make things. So he explored and explored finding some small production operation to invest in or buy.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A year and.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[1/2 of trying later, he essentially decided he couldn't wait any longer and he set up exactly the same business as he had done in Beirut and started all over.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:06:57 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Again, it's amazing because your dad must have been in his 40s by then.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah. My father was born in 29, so yeah, we could do the math. But you're definitely in his 40s.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:07 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[When you got to Montreal, I'm assuming you didn't. You were not fluent in French, so you probably had to because you you went to school. Presumably you was school was taught in French.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:18 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[No. So, so Montreal in 75 was still very much a bilingual place in the full sense of the word, meaning that you could coexist without speaking both languages on either language was fine. So I ended up going to and my brothers together, we ended up going to a Jesuit school and all boys.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:30 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Huh.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:38 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It was English, Loyola High School, but in the following three years in high school, took advanced French and and learned the language alongside English, which was the main language.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Of the school.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:48 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Did you grow up going to church every Sunday? Obviously that Armenian Orthodox Church is a ancient.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:07:57 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Church goes back to, I think isn't 9 times. Did you grow up going to to church every Sunday?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I grew up going to church. Not only now you're making me reveal all sorts of stuff that I've never talked about. I was. I was a choir boy from probably 7-8 years old till till I came to Montreal.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:13 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Wow.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:17 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And I continued in Montreal, as did my brothers. So we did go to church. I'd like to say every Sunday, but probably it was most Sundays throughout the year. So it's most most Armenians had a close interaction with the church and and we certainly.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:33 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[All right, so.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:33 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You are in Montreal and I know that you went on to to study chemical engineering at McGill in Montreal, but then you went to Graduate School in the US you went to MIT in in Boston, and from what I read that you there is where you began to focus on biochemical engineering.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:52 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:08:53 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah. So, as I was graduating from McGill, MIT was the only place I applied to. And now I know in hindsight that it was very hard to get in, and I might not have gotten in, but I must say I didn't know. Then I I just wasn't. Maybe this is. I've learned, since this is all kind of the the comedy of being an immigrant in that you actually don't know a lot of things.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:09:14 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Because people don't tell you you're supposed to apply to five schools and you know, there maybe some in Canada, some in the states. Yeah. So I just applied to one school. Thank God they took me. And it was fascinating. It was just a completely transformative experience and ultimately ended up joining.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:09:32 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A lab and pursuing a PhD and everybody wanted to start doing this form of chemical engineering, biochemical engineering because it was clear that a whole new industry was being born without the necessary engineering cadre of engineers and and principles to apply to actually making the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:09:52 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The end product. So it was a really fortunate time to be entering the field, took it, took about four years, so Oh yeah, I was. I finished.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:10:00 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The summer of 1987.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:10:02 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So so you've got this PhD in in biochemical engineering and you can probably go work for a huge chemical company. I'm sure there was a lot of. There were a lot of, you know, offers out there, but you decided that you wanted to maybe start your own thing. And I have to assume that comes from your dad, who is an entrepreneur, right? I mean that that you thought.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:10:22 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Let me why don't I start my own my own?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:10:24 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Business you would have made for a good story if that was the case, but it turns out it wasn't. I I did not think of starting a company.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:10:33 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Based on my upbringing. OK, so in 1985 I had occasion to go to Washington, DC to a conference that had been put on by the National Science Foundation. And by chance I had a I sat next to a person at lunch and and asked him what he did, and he started recounting this person was my father's age.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:10:53 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And he started recounting how he and another friend of his, some maybe 30 years earlier, had graduated from a brand new field of engineering, then called electronic Engineering.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And he said when he graduated, they realized that they didn't know what to do with what they had learned. And so he and his friend decided that rather than joining the fray of actually doing this type of engineering, they'd make instruments that their colleagues, their friends, would use in doing what they did. And they had invented the oscilloscope and and decided to make some. And.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:25 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Provided to their friends and they started out in the garage and overtime they grew up.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:29 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Listen, I found this very interesting. So I asked him who he was. I just didn't know who he was at all. And he was David Packard from Hewlett-Packard, literally. And. And I had like, it was really fascinating because again.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:38 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Wow.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:40 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And this is in 1985, so he must have been, you know, I think he died in the in the mid 90s he.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:42 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[80.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:43 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[This was 1985.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:47 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Was an old.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Guy older he was, he was. He was. Yeah, he was older, certainly. him and I I I haven't thought back as to what his age was, but I wouldn't be surprised if he was in his seventy maybe 70s. And at least that's how he looked to me. But very kind to spend the time and to make.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:11:56 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Sure.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And and one of the things I also remember asking him is I said, you know, like, do I need to have a technology, do I need to have an invention because I I didn't have the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:07 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:08 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The scope and he said, you know, not really because you're in such a new field. Anything you do will be new and useful. So that and that stuck with me because I I kind of came back with this interest in learning what I could about innovation and technology management because I figured those are at least generic things I'd have to know, but also the very first.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:29 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Business plan I ended up writing the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:31 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That a claim that we were going to do this didn't specify it. Technology literally just said we're going to develop instruments that kind of address needs in the biotechnology field. And. And I quickly learned that you can't raise money on that. You have to actually have something. So, but that's a long story.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:34 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:12:45 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You just said we're going to. We're just going to start something in biotech and we'll kind of figure it out and but it is amazing to me that that meeting with David Packard because he was, I mean, of course, everybody knows that name now, right? Hewlett-Packard name. But it really sounds like that encounter.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:13:02 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Kind of started to get the gears in your head.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:13:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Turning. Well, yeah, it definitely. I'll tell you, one of the things that I've thought a lot about and you know, generally I realized these are fields that people don't talk about and you only really at least back then used to hear about it glorified in some success story which, like Michael Jordan playing basketball, is completely unapproachable.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:13:26 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Or somebody who doesn't have the physique and doesn't have as I did. I've grew up playing basketball. I still play some basketball, but in the Michael Jordan was never an inspiration to me because he was so, so aloof, if you will. Physically from I could not do it.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:13:38 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[He did here was this guy who was completely grounded and normal and telling me about how he set out to do this and the way he said it, actually, what made me feel like, and you can do it too. And it was fascinating that probably singularly his making it approachable, relatable.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:13:58 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Was an important very and that's why I've kind of tried to do the same to as many.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:02 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Other people as I can.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:02 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Sure. I mean, he started that business with like 500.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:05 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Bucks. Well, it was 1939 or whatever, but still it was it wasn't that much money.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:10 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It was not that much money. Indeed. So, yeah. What happened is that I came back. I started trying to learn about startups in general, not necessarily one that I would do because I was not close to graduating yet when I was, I was a.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Couple of years out.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Still then I did in fact get approached by a West Coast San Diego based brand new startup company, which went on to be a.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:30 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Very successful, very successful, well known biotech company.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:33 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Idec. They were just starting at the time and out of I think shared desperation of not having anybody who knew engineering and they needed engineers to be able to.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:44 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Make their product.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:44 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah, they reached out to my professors and they said, look, who do you have graduating? And. And they said, well, this fellow is graduating and literally they made me an offer.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:53 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To be vice president of Process technology at this.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:14:57 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[By new startup which which you might have thought that would have been a golden thing.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:01 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Ohh my gosh and you would have guaranteed riches and and and financial security. All those things. Yeah, right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Because it was a startup.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes, yes, all those things. And I would have been a very early person there, etcetera. But what was interesting about that was that that's the first time I started thinking about, you know, what would my contribution be as opposed to what was my alternative thought, which was, should I try to figure out how to do the start up thing myself.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:26 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So I kind of I I remember talking and talking to lots of different people getting advice and the advice I got, which in hindsight was quite useful to me from some of my professors, was look, if you really want to be in a startup, be in a startup where what you do matters and you can score, you can actually make the the the contributions. And so that led me to ultimately.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Decide to start.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A company.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:48 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So the story I've read and and it's just a bare bones version, is that you.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:15:54 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You decided to go seek funding for your venture. You didn't quite know what it was going to be, but it's going to be a biotech company and you started to reach out to venture capitalists at the time in 87, and then you didn't really know what what that meant. But you knew that you had to raise some money. And how do those meetings go?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:13](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:14 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah. So the very first meeting I had and again these things all kind of in hindsight seem I'm only tell you the things that stand on my mind. The very first meeting I had was the Tuesday after Black Monday in 1987. So when the market crashed and as a by that time 25 year old, having just got my PhD.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:26 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[When when the when.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:27 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The market crashed.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:33 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Me. I had no idea why market crashing would have anything to do with startup funding, so I went literally and pitched to the very, very first time to a well known venture capitalist, Ginger Moore. And she gave me great advice, she said look, this could be a good time in a way to make sure you figure out what you want to do in the company because you're not going to have much competition.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:54 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Everybody's going to run for.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:16:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Run for the shore and and not really venture out. And if you really convict the town to figure out what's worth doing, go work on it. Get some Angel money if you can, and if you persist long enough, this will come back and and end it up. You know, and I've talked to a couple of other people, heard the same thing. And so that's what I ended up doing.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:13 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So how did?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:14 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You find the money to to start a bus.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:16 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Business because biotech is is cash intensive. Where did you get the capital?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, of course the you know, it's remarkable how you know, every decade the amount of money you need to do roughly the same thing goes up dramatically. But back then, late 80s, even early 90s, some of the more, you know, well known by tech companies, were started with.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:38 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Ten million, $15 million in my case, I only ever raised $11 million over a three-year period from which capitalist, but that was a lot of money. Yeah. So what I needed first was the first couple.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Of 100,000.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:48 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And and how did you get it?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:50 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I could tell.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:17:50 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You it was very, very hard. There's no better way of describing it than persistent begging, because at the end of the day, if you don't have something and you're proposing something that can't be shown to be either valuable or feasible, then I'm not sure what the difference is between.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:06 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That and begging.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:07 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Ultimately what happened is I talked to everybody and anybody I could meet ended up getting connected to a gentleman named Gus Esslin, and he was interested in investing small amounts of money and I got introduced to him and he said to me my lawyers will reach out to you and I'll give you $100,000, which was quite remarkable it took.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:25](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Hmm.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Probably you know more than a year to get to that point throughout this whole period. Yeah. And then in the meantime, I live.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:32 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Wow.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:34 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Off of, you know, borrowing from my dad and basically I got a part time job at MIT with my professor helping him, doing some things so I could at least stay stay afloat.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:45 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[This company, we found, it was called Perseptive Biosystems, and I'm going to sort of butcher this, but I'm going to try and explain this in a way that hopefully most of us can understand, but.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:18:55 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Basically, you produced equipment that separated and identified proteins, which is the basis of of of most biotechnology drugs. This is what what you need. You need to separate these proteins and they need to be intact in order for the research to be engaged.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:19:11 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[No, that you did a very good job and and I can put a finer point to what was the advance. The original advance was that chromatography which was used to separate proteins.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:19:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Had been developed to work on chemicals, not proteins. Proteins are much, much larger in size than chemicals, and so they move around very slowly. As a result, what used to be a technique that was meant to run for 45 minutes to an hour with proteins used to run for hours and hours. That limited the pace of advancement and research.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:19:41 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[What we invented were particles that had this interesting characteristic where you can actually force liquid to flow through them. As a result, everything went faster so that you can actually separate.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:19:52 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Is in 10 minutes 15 minutes and we showed that we could do this. We showed the the actual theory behind how it was working and then finally that led many years later to another technology breakthrough which really made perceptive kind of much more known, which was a technology called mass spectrometry. So we worked on inventing a whole new way.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:20:13 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To cause proteins to be amenable to this type of technique, and that really opened up the the protein research space significantly and our revenues grew.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:20:24 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Quite substantially, as a result of that second technology.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:20:28 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I've interviewed lots of people from from the creative arts world, from the scientific community, different spaces where they they didn't. They weren't sort of entrepreneurs or or business people and had to really kind of figure out how to structure a business.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:20:44 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And sometimes they make mistakes. How did you know how to do that? I mean, you had.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:20:51 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Partners and people involved, and I mean even with your investors, you're 2425. If they were like, yeah, we'll give you, you know, $100,000 for 10% of the business. Like how did you know what it was worth and how to structure it? And did you did you go to anybody for help?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:07 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I did. I went to lots of people for help and and it's actually one of the more formative things that I've learned, which is that if you don't pretend, you know a.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:17 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[People are much more prone to kind of advise you and help you, and it's not hard to pretend that when you're 25 years old, but that is the first time that helped me was was back in those days. I clearly didn't know much about raising money, spending money, planning, budgeting. I did have a lot of people around me who are willing to give advice quickly, realized that a lot of that.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:23 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:37 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Advice was quite, you know, kind of opposed to each other, so.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:40 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah, that's the challenge, right? It's.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:40 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You had to figure out.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:42 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Like a ping pong match.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:42 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Exactly. So what you have to do is you have to actually make some calculated bets and then and then I you know, I also learned early.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Gone just about everything you assume may be wrong. You constantly have to figure out, OK, if I can't keep going down that path, where am I gonna go next? It's too late to think of that. Once you're stuck, you know. Now being opposed by whatever elements you're up against so that there's plenty of people who gave advice. I have, in fact, one of the things I remember very well.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:21:56 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:22:08 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Was in the first instance raising money. I remember many investors. By the time I I had.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:22:13 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The story right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:22:14 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Telling me that they thought I'd be successful, but that they didn't think my first thing would be successful and so a whole bunch of them told me that they would wanna invest in my second company. And the other thing is, a lot of people told me, listen, you're smart, you're capable. You got a lot to learn. You should not be CEO. Yeah. And it was an interesting thing, cause I thought to myself, I couldn't tell whether what they're saying was good for me or.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:22:35 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Good for them. Yeah, it was indiscernible. Yeah. So what I decided to do is I kept talking to people until I found a firm to invest with me as the initial CEO, which is what I had been for the whole time, the year and a half.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:22:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Sure. And the day after we closed the $1,000,000 I went to them and I said I don't want to be CEO, let's go hire a CEO and they were like shocked. And the only reason I felt that way was because I wanted to make sure they weren't investing in, not me, but at the same time, I thought if they really think that we should really bring in somebody for.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:23:09 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A period of time who can help work with me. Then let's do that. And so we found a very, very good, you know, late in his.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:23:16 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Career senior executive I became Chairman and Chief Technical Officer. He became CEO and for a year we worked really closely together. He taught me a lot. He helped me out greatly.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:23:26 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And as you were developing more products for Perceptive Biosystems, who are your customers? I mean, I mean obviously most of the people I talked to are are making consumer products. So they're like today, it's social media marketing and going on Instagram to find influencers. But this is not what you do or did. Then obviously, who are you selling?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:23:46 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Your your equipment to.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:23:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In the first instance, there were a handful of bad technology companies at the time who were noteworthy. Biogen, Genentech and Amgen, Genzyme, and there was a whole bunch of pharmaceutical companies, the household brands of, you know, Roche and Novartis and GSK, Pfizer, etcetera. They all had research labs. They had huge research labs.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:05 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:08 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And every one of them used to do what it is we were selling and new technology to do.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:14 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And so, you know, early adopters were not a concept back then, but clearly early adopters is how you, how you get anything to be taken up and and they become your best salespeople because either they change jobs or they tell their colleagues, hey, I'm doing this thing really cool. You should look into it. And so eventually we started getting kind of slowly, slowly growing, hired our for salespeople.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:34 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:35 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And eventually, when the company grew up in 1997, at the end we were about 900.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:41 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[People as the company grew because I think within 10 years it was acquired, right. It was. I think it was acquired from the stock swap. It was a $360 million stock.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:24:51 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Action and oftentimes an acquisition means that the founders who are acquired join the parent company now and you did, I think the company was called APPLERA. This was the late 90s and and if people remember this was a time when there was an obsessive race to map the human genome.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:25:12 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And you were right there at kind of Ground Zero of that.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:25:16 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes, so so a player actually was a made-up name that came after the fact. The initial company that bought Perceptive was called Percona, right. Ultimately the thing we decided to do was to become a content delivery company modeled after Bloomberg with the Bloomberg.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:25:32 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Terminals. As you may remember, so Bloomberg takes public information at least dated back.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:25:33 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Sure.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:25:37 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Annotates it, interconnects it, adds some proprietary layers on it, and then sells it as a subscription, essentially through terminals, and we thought we could do the same thing with biology and the Human Genome Project was kind of the the actual sequence became our way of actually trying to get people to come to our site in order to receive all these.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:25:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Higher level connectivities from that baseline information.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:00 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So this would be like a Bloomberg Terminal for biotech companies.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:04 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Absolutely. That was the. That was absolutely the vision.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:05 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Wow, the idea would be like every finance firm had a Bloomberg Terminal. Every biotech company would have these terminals and you could access.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:14 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes, this.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:15 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Proprietary information.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:17 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That's what we set out to build. We needed to sequence the genome first, and we at first thought maybe the government can the governments effort at the time would suffice. Yeah, but it was going fairly slowly. And so we launched a what became a competitive effort, although it wasn't fully intended to be competitive in the 1st.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:34 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[With with the Human Genome Project, you start to compete.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:34 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Instance because.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:37 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[With them because.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:37 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:37 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[They weren't moving, it wasn't moving fast enough.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:39 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It wasn't moving fast enough. We weren't going to wait till three more years before this information could be available, but it definitely at the time allowed.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:26:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Of sides to do something quite spectacular, which was to complete the sequencing of the genome in our case as a prelude to delivering this content business in their case as the basis for much of research going forward.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:27:01 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It's amazing because you you are now. You now spent a year being involved in one of those groundbreaking projects in I think in the 20th century, mapping the human genome, which clearly you knew was going to have a huge impact on medicine. Did that experience kind of once again kind of get the gears?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:27:21 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Turning your head thinking there's an opportunity from this for me to pursue.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:27:28 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes, very much so. But in in a different context than just the market opportunity. It was actually a foray into entrepreneurship, which is when a company creates a company and I've never thought of that as a as an activity before where you literally can have a parent entity.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:27:40 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:27:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Conceive of one thing and really develop it internally and then spin it up, which is what we did that actually was equally interesting. Of course, being in the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:27:57 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Middle of this whole kind of public storm, if you will, in the in many ways positive sensitive word and excitement also pointed out the fact that this we were entering a new era in molecular biology, so that was exciting, definitely.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:28:12 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[When we come back in just a moment, how the new era of molecular biology.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:28:17 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Just happened to match up with Nubar's idea for an entirely new type of biotech company. Stay with us. I'm Guy Raz, and you're listening to how I built this for my PR.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:28:42 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[00:28:53 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[00:29:17 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Hey, welcome back to how I built this.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:29:19 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I'm Guy Raz.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:29:21 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Though it's the late 1990s and Newborough fan is working at a biotech company called Applera, and he's involved in lots of different.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:29:30 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Projects, but overtime Nubar is getting more and more interested in promoting a whole range of new promising molecular biology research that doesn't necessarily have immediate commercial value. And so eventually he leaves Applera to try to reimagine the way biotech companies are created.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:29:51 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The idea was, you know, everybody was all fascinated with serial entrepreneurs and. And you go from 1:00 to the other. But the question that I got intrigued by, I'm not exactly sure. Why is, could you actually do this at the same time, could you have multiple of these things? And and I was always curious about the venture capital community, which, while they weren't starting these companies, they were investing in them.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:30:14 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And they had this parallelism down, they could be involved in therapeutic companies, some in cardiovascular, some in, you know, cancer that didn't. One didn't seem to interfere with the other. And I thought, well, why can't you do that as an entrepreneur? Why can't you do that as an innovator?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:30:29 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And so we started an otherwise unusual entity which was called NEUPOGEN, and it stood for new company generation new Cogen, that business new Cogen is the entity that data became called Flagship Ventures and the flagship pioneering we put up about $60 million. It was a company that would create companies.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:30:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And and that's how we started the initial four or five projects. We already had some ideas what to pursue, but it was definitely buoyed by the excitement around the genome.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:30:58 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So this was so flagship ventures now called flagship.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:31:02 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Hearing this is what you kind of really launched in 2000 and this was to be clear, I mean this was very different from and still is very different from what incubators are. Usually incubators are incubators, and venture capital is venture capital. And this idea was different. I mean, the idea was that everything would happen under one roof.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:31:23 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Exactly.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:31:23 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The research, the development, the teams, the businesses like almost like like a like an MIT Media Lab. But that was a private business.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:31:31 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, it's an interesting way of putting it. I'll tell you. You know that what we set out to do is to combine the typically three sets.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:31:41 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Inputs into a successful startup. That is, the scientific ideas usually comes from academia, the entrepreneurial talent, and then capital, which is always multiple sources. Venture capital, early stage and then eventually some later stage.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:00 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[They all come from different places. They have different interests and so you could imagine there's a lot of friction between all these different different components. What we thought is what if all three of those things pre existed.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:06 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Sure.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:12 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In the same entity? Yeah, because if you want to propose doing something that is way out there, if you will. If you're doing it the traditional way, you have to convince other people to join you. And in any case, you have to convince investors to fund.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah, and all they care about is to minimize the risk. And so that's where we really found our.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:33 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Footing is to say, can we take that advantage of having all three under one roof and apply it to propel ourselves?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:41 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Beyond where people are comfortable going.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:32:44 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Nubar obviously by this point when he started flagship, you were a known entity. People knew the story of, you know, your previous businesses. But how did you recruit talent to come to come to flagship and to take that leap that you guys would have their back?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, I would say it took quite a while.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:03 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Umm.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:04 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So the first battle was hiring leadership into our companies because our own team size didn't have to grow very much. But the companies we were forming needed to track leadership and that was where we started really thinking more systematically what kind of people could make the transition. Unlike the software field and.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:24 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[For that matter, these days Internet based companies or apps.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[There's a lot of people who've done multiple companies in biotech. These companies have a half life or a life cycle of, say, 10 years, 15 years. So people don't do one company after another after another after another. If they do one company after 10-15 years and they succeed, they stopped doing it. So you have to create the talent. You have to create.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And and cross fertilize and so their early leadership of our companies is all flagship numbers and.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:33:55 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You know that what that does is it doesn't mean that they're any better. It just means that they're more experienced and we're more familiar with them.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:01 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You had a huge advantage in that you were in one of the biotech capitals of the world, which is the Boston area, but I imagine you were recruiting, probably promising graduate students and scientists. Do I have this right that you would basically?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:16 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Pair them up.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:17 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[With people who could help to navigate their businesses, so presumably people with science backgrounds but who could do the business side of it.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In the earlier days it it was a more experimental, if you will. I I did a lot of that just because I had quite a bit of experience by this time.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:35 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You would just go from little company to company and kind of help them out. Help guide them, yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:38 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Absolutely. So yeah, there was a time back a decade ago when I'm when I would have been on 15 different boards and literally literally was was kind of running around trying. I had a colleague, Doug Cole, who's was was with us now as a managing partner. So it was just early days in 2000, 2007.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:55 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[We were figuring.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:34:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Out what can be systematized and what cannot and what is a team sport and what is not. You know there's a lot of folklore in the startup world which I'd say emphasizes the role of the individual. There's a hero kind of a notion that's created, you know, against all odds and.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:14 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And here we were claiming that.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:18 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Conceiving, creating, growing companies could be the object of a company. Very methodical, very learning oriented, responsible to certain goals or accountable, let's say, versus kind of improvisational, romantic, chaotic. All the things that come to mind when you think of startups I've.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:38 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Spent the last 20 years together with my colleagues here trying to show that most of that is unneeded. Some of that may be needed. Some of that may be how people decide to do it, but that's not like that's the only way you can do it.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:43](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Hmm.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:50 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And just to be clear, most of these companies that you were hatching and formed.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:54 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[They were focused on biomedical research mainly.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:35:58 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[They were focused on biomedical research or applications of life science in sustainability.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:36:03 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Got it. So so there's a there are a lot of stories like origin stories around M RNA research that that go back to the 70s and the 80s. And Bob \*\*\*\*\*\*, who is he's one of the best biotechnologists in the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:36:17 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[World and you would go on to become a a Moderna co-founder and he was doing all kinds of research. And in the early 2000s I I read a story about some researchers from from University of Pennsylvania who were doing some pretty ground breaking work around M RNA. They went to a scientific conference and almost nobody.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:36:38 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[This is 20 years ago. Almost nobody in the scientific community was taking this seriously. When did you first? What did M RNA research first come onto your radar?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:36:50 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Let me answer that by first pointing out to you that five years ago, nobody was taking M RNA research seriously. So that's kind of an interesting thing. But back in 2010, May of 2010, got a call from Bob \*\*\*\*\*\* one day and he said to me, hey, look, I just met.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:36:55 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Thank you. Yes.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:37:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The junior faculty member at Harvard to approach me, and so I went over and met with him and met with the faculty member, Derrick Rossi, and he showed some of the scientific work that this lab had done. Essentially what they've done is they've taken M RNA and used the codes for the four. What's called Yamanaka factors Yamanaka factors.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:37:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Are.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:37:28 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Transcription factors. Think of these as proteins that interact with the human genome and control what genes get made and what genes don't get made, and that's what he was presenting and he was interested in that as potentially the basis of something useful in the biomedical research field.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:37:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I got interested in on the spot. You know, what if we could do this to introduce it into the body and have our own cells, make drugs out of it? And so I asked that question in the meeting with Bob, we kind of be, he said, look, I don't. I don't know why we couldn't try. And So what ended up happening is we.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:06 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That I would go back and initiate a project within flagship to start exploring whether that could be something of interest and use without any regard to whether we could technically do it or how we could do it, but rather more just explore. Could we think about a molecule that when introduced to the body could cause the body to make?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:26 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Protein we wanted and that's how the journey started for us. That's what became a learner.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:32 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It's amazing. I mean the the idea was that you had was, could we basically, you know?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:39 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Could could you could.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:40 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You make medicines where you inject them in order for the body to develop the proteins right to to combat the the ailment or whatever it is that that was the question that was being asked.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:51 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The time.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:52 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That was the question that we asked as the impetus for an exploration.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:38:56 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And the answer to that question in general was no, that's ridiculous is that is that right, more or.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:39:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Less well. The premonition was that it was ridiculous because it had never really been shown to be viable. Hmm. And we, you know, by asking the question.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:39:09 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Then we gave ourselves the permission to go find out why it is that either nobody had done it or nobody believed it could be done, and we quickly found out that people had tried it in the 80s and they had caused pretty significant immune response in cells. So people had this idea earlier, but it turns out it's not just the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:39:13](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Mm-hmm.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:39:30 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[M RNA in the immunology. You then have to figure out which cells are going to take these up. How much do they have to take up to make therapeutic doses available in your circulation? How do you know if the protein is actually the right protein? Meaning will it fold correctly? Will it secrete correct? I mean you're basically going.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:39:34 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:39:47 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In and introducing a tiny new piece of software, not hardware, you're not messing with the hardware the genome, but the software to to make a particular protein in a sea of thousands of other proteins being made every nanosecond of the day. So. So you gotta get in precisely.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:40:07 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Make the protein you want have the effect.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:40:09 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To want you know. So there was a lot of as an engineer, there was a lot of unknowns, but we could list them and we could start asking a lot of people out there. What makes you think it can't be done? What are the impediments, what has been tried? That's how we do much of our innovation is that we kind of work backwards from a an asserted destination.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:40:30 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[We want to be able to do this and then try to tie it to the present.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:40:33 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I wanted to ask you about about.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:40:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I mean, I understand that flagship was really designed to do exactly this kind of work to, to take on something risky and kind of weird and maybe the the scientific consensus was kind of not there was no consensus. The community was skeptical of this research. I understand that flagship was designed for this very reason in order to.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:40:56 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To take some risks that might fail, but I'm curious. I mean, this was going to require a lot of money, a lot of time.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:05 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And and a lot of uncertainty and and and most I mean you had great researchers and scientists, I mean, didn't anybody in flagship that you talked to say this is not what we should pursue didn't didn't anybody push back, didn't you have doubts?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:23 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I think we should try to put it in context.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:25](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:26 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The important thing to realize is that we.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:28 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Are set up.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:29 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To make innovation leaps that are beyond adjacencies so you know this, the the notion of adjacency, if you just simply on a piece of paper said in any given field in any given endeavor of activity, I could draw a circle and let that circle represent everything that's known.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Everything that.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:41:51 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And then I draw another ring around that circle that represents all sorts of things that have not yet been done, but are going to be done next. So imagine a sense of the arrow of time going, you know, outward from 1 circle to the next ring. Sure. And that's kind of for me, a simplistic mental model of how.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:11 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Innovation science products in the marketplace.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:15 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Here now what defines the size of that adjacency? It's how far people are willing to go before they stop thinking that something is reasonable to work.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:25 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[On.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:26 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So the question is, when will we ever work beyond that adjacency and in the ordinary course you get there when you get there, so you wait.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:34 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[For a while.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:35 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Some new things happen, and then eventually you start working on what would have been too far out before, but now it's not.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:41 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So far out.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:42 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So our job is to see if we could work beyond the adjacencies today.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:48 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[But what I'm trying to understand Nubar is this could have been a very different story, right? The story of Moderna could have been.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:54 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A story of folly.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:42:56 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Of a bunch of, you know, well funded scientists who just spent.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:43:01 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[All of this money, and it was a disaster, and we could have been telling this story. That story at business schools, right. I mean, there's always a possibility that would have been this story. And by green lighting Moderna, you had.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:43:14 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To consider certain factors, but if if most of the scientific community was saying this is not worth doing, why did you and your team think differently?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:43:25 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[So you're asking the question in a in, again in in the context it's a very valid question, but I want to say you're asking the question in isolation. Let me also just tell you that in the exact same year that we did the foundation laying for what became maderna, we also started four other projects that were each platforms in their own.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:43:33 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:43:44 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Right. Going after different aspects of biomedical opportunity space, each with as big a leap, each with as much doubt. And we did that the year before and we've done that for the 11 years since. So in fact, I've described this before and I think it's really important.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:43:59 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To understand we.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Didn't conceive of Moderna. We conceived of 100 different modernas.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:05 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:06 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And what's happened is, and this is very much how I look at this, is that experiments in reality and and execution have dictated which of those modernas got to live and which of those.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:15 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Modernas got to die.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:16 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[How how many of those other?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:19 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Quote modernas.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:20 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Didn't make it so we launched 100.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:22 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[A lot. A lot. We didn't launch 100. We had imagined 100, right. And so that's the point I'm making is the accuracy with which you have to guess what's gonna work is not at all important because we get into these brand new areas. It's wide open to find where value lies, right? Imagine if we waited 3-4 years as people.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:42 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Did or 10 years in the case of mRNA, now all of a sudden they go into the space and there's hundreds of patents.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:44:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And there's tons of different things that have already been done. That's a very different competitive approach. What we tend to do is say, you know what, we'll risk the possibility that there's absolutely no value to be had. So it's not that you have to get it dead right where you land, you just have to be in a rough space where you now start searching.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:45:00 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:45:08 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[For where value might be, is it delivering it into the liver or skin? Is it delivering? You know, doing vaccines or cardiovascular drugs? Yeah. So all of those variables, at least for me.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:45:20 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Represent alternative success versions of which I don't need everyone to succeed. I just need one to succeed.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:45:30 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[When we come back in just a moment, one version of success that Nubar did not anticipate was how Moderna would develop a critical vaccine at a critical time and do it unbelievably fast. Stay with us. I'm Guy Raz and listening to how I built this from NPR.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:46:02 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[00:46:19 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[00:46:32 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[00:46:53 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[00:47:04 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Hey, welcome back to how I built this. I'm Guy Raz. So we're getting to the part of the story where Moderna will go from being a biotech company. You probably never heard of to a household name for 10s of millions of people. And it's easy to forget that when the company launched in 2010.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:47:22 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The idea was to find the best use for the new research around mRNA and at that time it wasn't at all clear that the best use.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:47:32 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Would be a VAX.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:47:32 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Team we worked from day one on any number of diseases, cardiovascular disease, cancer and and vaccines were a part of our thinking process. But indeed, what we did do is we went after everything, right? That's the 100 versions of Maderna that I'm referring to. We did not think for a minute.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:47:53 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That we were smart enough to anticipate what we should actually apply the platform to, and this is something else that probably is worth pointing out. We have over the years in our flagship labs.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Kind of realize that rather than inventing technologies, we really are to invent platforms, and our platform is a relatively rare thing in biotechnology, unlike in the tech sector, where we've seen phenomenal examples of platforms, whether it's the iOS, you know, Apple's platform or Amazon's.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:10](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Hmm.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:25 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That whole idea of a technological.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:28 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Meat upon which many, many products could be developed or attached. By 2010, before we even started. Moderna. That is something that we had started many, many companies around that notion. And so Moderna only ever was going to be a platform that enabled a code based molecule to make proteins.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In the subject, no matter what application it was.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:52 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And a key discipline of that is to say try many, many applications. And so we had by the time this coronavirus came along, we had tested 9, maybe even 10 different human vaccines in every single case, showing neutralizing antibodies. And we had also another nine programs.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:48:56 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:49:12 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That we're going after human therapeutics. So it was a fairly broad platform that had already been developed about $2 billion of research had gone into developing the platform.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:49:22 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:49:23 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You you in public in in 2018, you still hadn't sold any products really you had an operating loss of almost $400 million.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:49:34 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[2019 still you this is nine years in to Moderna. You had not. I believe you had not sold anything yet and you had almost half a billion dollars.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:49:44 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In losses, but none of that seems like like none of that seemed to to faze you or the team at all like that was not even a concern.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:49:54 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah. So it's not an, in fact, guy, what I can tell you having spent the last 34 years in the biotechnology field is that there is no biotech company that was started in two.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And then, with rare rare exceptions, maybe one in 100 that had revenues by that time. And so it's par for the course in the sense that that's not because of the failing of the technology. That's because it takes 5 to 10 years to actually develop a product in our field. So it's a little bit like saying, you know, I want to start a new.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:20 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Airplane company. And then I'm surprised that I don't have an airplane on the market in the 1st 10 years. What takes 14 years now? What would have been?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:32 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:35 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Is if we didn't have products in clinical testing and and that's something that was completely missed because before a single vaccine for coronavirus that we tested, we had already 2000 people who had received M RNA from us. And so we were far, far advanced in actually.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:38 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In trial, yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:54 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Many.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:50:55 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Many different mrnas for different activities, vaccines, non vaccines and that's what allowed us to have the conviction that what we would do in this space could be quite productive.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:51:06 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[OK, let's let's go back to to the timeline for a moment because it's almost like plays out like a like a movie, like a thriller. And from what I understand.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:51:16 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And I think it was like January 6th, 2020. Stephan Bancel, who's the CEO of Moderna. He found out about this virus in China and that it was probably a coronavirus. And I think a few days later, the first death was publicly announced in China. And at at that point, I think that's January 11th.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:51:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[2020 almost no one in the US was was talking about this seriously or in a big way. I mean, probably a few people, but almost nobody.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:51:45 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Do you remember this story coming onto your radar around that?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:51:49 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Time. Well in the very early parts of January, we were exchanging emails and articles that were, you know, kind of appearing largely around the Wuhan situation. Initially it was thought to be a flu like thing and pneumonia. And it wasn't until.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:52:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[January 23rd, which I remember quite clearly, partly because it was my daughters. One of my daughters birthdays and and and so I I was out at dinner with her in Cambridge, close to MIT. I actually got a call from Stephan, who was in Davos. The situation had increased in terms of intensity.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:52:25 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It was not.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:52:26 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Clear what this would become. It was not a pandemic. There was not at all viewed that way, but but that it could become a threat was beginning to at least appear. And our discussion, interestingly, was twofold 1.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:52:40 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[We probably didn't have any choice but to at least do the first steps of this work, because if we didn't then we'd be late reacting to it later on. But then second, it was an interesting opportunity for us to test the platform in one of its earliest at least imagine the advantages that we could never test in any other time.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:01 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Which was.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:01 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That it would be a very rapid response technology. This technology had this innate advantage. We knew from day one that if you ever needed to go quickly, we could really go quickly cause we're so it's just a code molecule. You just sequence, put the sequence in for the DNA you make the RNA in one step, you put it in LMP in a second step and you're done. I mean it's I'm simplifying but not by much.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:22 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And So what was exciting to us was that we said we want to test our platforms ability to demonstrate very rapid capability to respond and and we did not know how what a, what, an advantage that was.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:34 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I mean, I think virtually overnight you and and Stefan decided to pursue this to try and do this to manufacture the vaccine.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:42 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Absolutely. It looked like the right thing to do and an incremental proof point for us that we we're happy to jump into. Now. I must say within days, probably a couple of.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:53:52 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Makes the whole thing changed and its importance and significance, and we were quite happy that we had jumped in so early on because that's the only way that by already March we could enter the first humans and get data.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:06 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[How long before you had a prototype for the vaccine? Because uh, from? From what I understand, the fastest time it took to get a vaccine from development to market was, I think, the MMR, one of the one of these childhood thing. Measles. Yeah. It was like five years or something. So in this case, how quickly were you able to?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:19 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Results.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:27 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To develop a prototype.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:28 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[From the time we had the sequence.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:30 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[To the time we have.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:31 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The sequence of the of the coronavirus, which the Chinese published, I think right they made.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:33 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Of the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That available, yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:36 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That's right. And and to the time when we had the computer generated sequence of the RNA that is essentially today M RNA 1273 was 2 days.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:47 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[2-2 days from the time that it was published.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:48](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:51 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You basically had had a a computer model of a vaccine.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:54:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Basically, a computer model of the sequence of mRNA that would essentially, when introduced into a human, would produce the S protein sufficient to generate an immune response.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:55:06 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I mean, at the time, did you know that if it just got into clinical trials, it would be, it would quickly be shown to be effective? Like did you know that from the computer models?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:55:17 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, we knew that in every other protein that we had used in humans before we could generate neutralizing antibodies that much we knew.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:55:25 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Whether we could make enough of it quickly enough, let alone to be able to do a 30,000 in a subject trial which we've never ever done or dreamt of before, that was the unknown. The unknown was can you make enough of it? Yeah. And we had some questions as to what those we should choose, but essentially there was a lot of known and we just had to kind of.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:55:45 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Decide and based on the best information what to try. We tried it and by May of 2020 we had already the first human data that showed that we could generate robust antibody levels.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:55:57 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In in March of 2020, you began clinical trials with the NIH. Was was a, I think, a nurse in.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:04 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That same month, March of 2020, your father-in-law died of COVID.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:11 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[April, April is when he passed away. Yeah. Yeah, minister.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:13 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[In Sweden, I mean this was affecting all of us. I mean, everybody knows somebody who was by their severely ill or or was killed by this.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:25 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I was devastating because his wife and mother-in-law also got quite sick and we thought we were going to lose her as well. They were both in their early 90s, so it was it was very, very tough also.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:36 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Because, you know, we were engaged in this day-to-day battle and on the one hand, I was excited by what we were able to do. And on the other hand, when you see, you know, in his case, ultimately a life lost, you know, it's anyway, it's. It was quite personal to me. Let me just say that I have not lost a family member during the time of.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:57 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Of iPhones and and I can.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:56:59 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Tell you that being on a FaceTime with somebody close to you when they're dying is a miserable, miserable experience. So it was very tough, and it it certainly made brought into sharp focus what this was all about. Certainly many, many people lost lives and many more are suffering. Yet today, with the downstream effects of this disease.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:57:21 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[But you knew already. From that first clinical trial that the news was good, that the initial results from from phase one were good, but but you had to go through two more phases and we the public were not Privy to that information for a variety of reasons, right? You can't. You could not come out and say hey.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:57:41 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Phase 1 looks great. These are the results is that there are rules against that, right?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:57:46 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, we indeed in May, we indeed did come out and say at a very high level that we had some encouraging results and people attacked us to every which way for having said that because they basically.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:58:00 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Said, well, that's doing science by press release and many other things and and the reality is when you have a pandemic and you're a public company and you've got material data, our sense was that we at least needed to at a high level put that out there. So one of the things we learned because none of us have been in this situation before and was that we were going to get criticized no matter what we did.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:58:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And so we just have to do what we thought was right, make some calls, you know, explain ourselves and. And so we did that we we ultimately published the data and I each came out and presented their data. We were quite surprised that people were questioning the NIH's own clinical political research that we didn't do the clinical work they did.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:58:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:58:40 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[By the end of the third trial phase three end of November and you announced.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:58:46 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That the preliminary data showed that the efficacy rate was 94%. Did that that surprise you even you?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:58:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It did surprise me and it didn't surprise me scientifically, it surprisingly me. By that time I had lowered my expectations, largely by having heard so much about how difficult all this would be to look at our vaccines are made. They either take, you know, bits and pieces of proteins, and they make them artificially, and they combine them.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:15 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And they put adjuvants to.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:16 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Kind of get your immune system to get angry. There's nothing molecular about the current approaches here. We were putting in a single protein delivered a known way to specific cells. And so we were really priming the immune system, but still there was no basis to believe that we could do 90 anything. It's not at all typical in vaccines.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:37 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Let alone with a new technology, let alone.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:40 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The gates that you start at 94, we thought if we were well above 50% at least we will start putting up a fight and maybe we can make a.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:42 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:48 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Better and better version.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:49 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And in parallel to the testing, presumably you had to ramp up your ability to produce this vaccine.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[00:59:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yes. And that and that was really the the massive heroism that I think of all the things that we could not imagine.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:04 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[We could make, you know, a billion doses the first year of production, up from probably making, you know, 1000 doses the year before of.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:13 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Anything.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:14 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[How did you do that? How did you go from the capacity to make 1000 or 10,000 to a billion in less than a year?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:20 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, first of all.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[All these things start with people. We had the great fortune of having a gentleman named Juan Andres, who, as head of our whole technical operations, manufacturing quality, the whole field previously held that role. At Novartis, one of the largest pharmaceutical companies, had gone through previous.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:39 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Flu epidemic kind of scale up of vaccines of that generation.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:00:45 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And just is a phenomenal leader of people and he was really a godsend to us. And when it came to planning, rapidly responding, organizing, hiring people and just not taking, that's not possible for an answer for just about anything that they that they did in terms of either time frames or scale.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:05 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And several months later, we started producing millions of doses and then eventually 10s of millions and hundreds of millions of doses.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:13 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[What does this mean now? I mean, what? What does?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:18 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[What does it mean for the development of other vaccines or other UM treatments? I mean, has this at least to the scientific community, proved that you can really maybe develop a long lasting flu vaccine or a malaria vaccine or an HIV vaccine like is that is that within the realm of possibility?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:39 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Well, you asked me two two questions in one. One was has it proved that the answer is no, but does it suggest that that's possible and perhaps wise to work on the answer is yes. And we are working on it. No, no. And and and I'm only.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:47 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That's right.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:50 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That's a better question. Thank you.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:53 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Saying it because.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:01:54 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Look, I learned long ago, Thomas Kuhn and all these guys have written on on these things that.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:00 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You know, the scientific process is one of organized skepticism. Yeah, and that organized skepticism is a good thing because it keeps you constantly looking.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:08 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[The proof I would say that there's there's a slightly greater reason to believe that M RNA could actually be a new drug modality, and but the other thing it does just to come back more broadly to what it is that we've been doing at flagship is that it it illustrates that yet again completely.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:28 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Transformative things could come out of unreasonable beginnings, and that if all you do is look for reasonable beginnings, you're probably not going to find breakthroughs.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:38 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[It's probably remarkable to young, younger people today that that everybody had the chickenpox not that long ago.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:46 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And no, kids don't get it anymore because there's a vaccine. Is there a potential future where?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:52 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[There's no such thing as seasonal flu.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:02:55 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That I cannot say, although I never want to say no to that either because more broadly, by raising an issue which which is important to me and I've, I've worked for the last two years.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:03:07 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And that is probably what I would view as health security or practicing medicine in a preemptive way. And what I mean by that is we've learned so much about disease that we realize that disease isn't just a switch that goes on and all of a sudden now you have it.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:03:12 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:03:21 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And you have to.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:03:22 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Find it, but that there are long ramps kind of on ramps towards disease.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:03:27 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That if we could intervene long before the disease is manifest and we can find it now with with new techniques, then both to prevent it through vaccines, but also to delay it, slow it down, redirect it. There's many things we can do. And I think unless we do those things.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:03:43 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[If all we do is wait for diseases to be good and advanced until we start treating them, the cost of that, the human loss, you know, as a result of that is just going to be prohibitive. So in the same vein, I can't imagine a time when seasonal flu is mastered and basically kept up day. Why?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:04:03 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Because I think that we're learning enough about the immune system that if we intervene early enough and broadly enough, we may well create a shield, a protective shield against these hyper variable viruses like influenza, like corona, like rhinovirus that causes the.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:04:20 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And flu, like HIV, I mean, there's a lot of these threats that aren't just themselves threats, but that they're hyper proliferating threats. And for that our immune system is the only answer.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:04:32 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[But when you think about the arc of your career in your life, you know a chance meeting with David Packard, who kind of inspires you to think about maybe starting your own thing, taking a gamble on M RNA, which would lead to the fastest vaccine ever manufactured in history to now.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:04:52 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[You know, Moderna was founded 10 years ago. I think it's market cap. The last I checked was almost $170 billion.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:04:59 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And that's just one of the businesses you you started. It's a pretty remarkable story. How much of of your of where you are today?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:09 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Do you attribute to how hard you work and how much do you think has to?](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:12 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Do with just luck.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:16 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[How hard I.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:17 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Work is a function of probably the orientation that I had that as an immigrant. You don't really take much for granted. You don't think much is owed to you and everything is a possibility.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:24 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:29 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And you have to go get it. In my case, the motivator has been truly trying to figure out if we could innovate.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:36 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And new way to innovate. Yeah. So hard work. Yes. In terms of luck, you know, it's it's ironic that you're that that you asked me that because somebody had written to me something the other day that I wanted to respond to, but I didn't by saying better, lucky and good in the sense that I think that to some extent counting on luck is not a strategy.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:05:56 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[But it is the case that no matter how hard you work, there's no guarantee that the opportunity will come up or that you will fail to fail long enough to succeed. And these are all things that otherwise can only be explained by chance. But I don't know what to do with that because I can't count on it. I can't summon it. If I could summon it anytime.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:06:05](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Yeah.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:06:16 Speaker 2](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That would be fun, but I can't and so therefore it doesn't. Will doesn't play any role in in my actions, and when it comes it comes.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:06:25 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[That's Nubar a fan. He's co-founder and chairman of Moderna, and he's also the founder and CEO of flagship pioneering. Today, Moderna is probably the most famous biotech company Nubar has developed, but since it was founded over 20 years ago, flagship pioneering has helped launch more than 100.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:06:44 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Other companies, and of those thirty are now publicly traded.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:06:52 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

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[01:07:04 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And if you want to follow us on Twitter or at Guy Raz or at how I built this, you can also find us on Instagram. That's at how I built this NPR on my personal account at guide dot Raz. This episode was produced by Casey Herman, with music composed by Ramtin Erebuni. It was edited by Neva Grant with research.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:07:24 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[From Claire Morishima, our production staff includes JC Howard, James Delahoussaye, Rachel Faulkner, Liz Metzger, Julia Carney, Farrah Safari, Elaine Coates, Annalise Sober, and Harrison B.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:07:36 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[Troy Jeff Rogers is our executive producer.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:07:39](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[I'm Guy Raz.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[01:07:40 Speaker 1](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)

[And you've been listening to how I built this. This is NPR.](https://1drv.ms/u/s!ACuE0Z-4JoB_ggA)