

## CONVERSATIONS WITH MIKE MILKEN



**Robert A. Bradway**

Chairman and CEO, Amgen

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**Mike Milken: Bob. Thank you for joining us.**

Robert Bradway: Thank you, Michael. It's a privilege to be here with you.

**You have 24,000 employees in the U.S. and Europe. This is your 40th anniversary. I am sure it's probably not the celebration that you had planned. What are you doing to ensure your employees are safe? Because the work of Amgen is so essential to the world, particularly at this time, what are you doing to continue fulfilling your mission to cure disease?**

Well, thank you, Michael, first for recognizing our 40th anniversary as a company. We marked the day quietly in light of everything that's going on in the world with this pandemic, but it was nonetheless an important opportunity for us to remember all the work that's been done in the biotech industry and all the progress that Amgen has made in trying to treat serious diseases. We have, for about the last month, had our staff working remotely in order to try to provide the social distancing that I think this pandemic requires. And we've implemented a variety of additional support programs for our staff to try to help keep them and their families and their communities safe.

Some of our staff obviously are critical, and those are the staff engaged in manufacturing our medicines for patients. We also have important clinical trials underway and we have staff that are doing their level best to make sure that patients enrolled in those trials don't find their clinical programs disrupted by the current events. So we have clinical colleagues working as well as manufacturing colleagues to try to keep the wheels moving on those important patient-supply topics.

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**I remember, for me, a very important meeting 27 years ago. I came to Amgen to talk to your CEO and research group and try to encourage them at the time to substantially increase their budget for cancer. I remember they told me they appreciated my relationship, but they couldn't do anything at this time. Two years later I got a call that Amgen was indeed substantially increasing its commitment to cancer research and has made quite a difference for cancer patients. Talk to us a little bit about cancer therapies and Amgen.**

Well, thank you Michael. Your story, I think, is a powerful Testament to the importance of having faith in science and technology and innovation. You certainly proved the initial forecasters wrong, thankfully. I know your listeners are probably well aware of this, but we were all, in the community, tremendous beneficiaries of the work of your organization and trying to advocate for cancer patients in need of innovative therapies.

The more we learn about how cancer evades the immune system, the more we can try to prevent that from happening. We are at the forefront of that and making great progress, including in a disease that I know is important to you, which is prostate cancer. But in addition to prostate cancer, we're exploring novel molecules in lung cancer; we're exploring novel medicines across a range of so-called liquid tumors – the blood cancers – and really very optimistic about what we see, not just in our own portfolio but across the industry.

**Today the human suffering on our planet is so significant due to the coronavirus. It's not just those that have gotten the virus, or families or loved ones or coworkers that have passed away, but the shutting down of the world's economy has had even greater effect on a number of people today. How is Amgen balancing your efforts to address COVID-19 with your continuing efforts in other areas?**

It's hard to balance anything right now given the press of this global challenge that we have in addressing COVID-19. This is, of course, unlike anything any of us have experienced before. This synchronous global shutdown caused by what is a pretty tricky virus – a virus that had a head start on all of us. But we're gaining ground fast.

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We have a few programs that capitalize on our strengths in biology and biotechnology aimed at COVID – one which would seek to bring forward so-called neutralizing antibodies against the virus. Then we have others we are exploring as possible ways to help modulate the immune system's response to the virus, which is causing the end-stage damage in the lungs of those who are hospitalized and critically ill.

So we may be able to play a role in two different areas in fighting the virus directly. But it's important to note that there are other urgent, life-threatening diseases – and medicines required for them. So we need to make sure that while we're responding to COVID-19, we're not doing it at the expense of all these other patients, or we're going to create a secondary healthcare crisis that we never intended and that we could have prevented by striking that balance.

**I remember back in 2012 when Amgen decided to buy deCODE Genetics. What does deCODE do? What capabilities did it give you that might help you address COVID-19?**

deCODE Genetics is a world leader in the field of human genetics. The idea is that we study human population, in this case in Iceland, to try and develop a better understanding of the biochemical or biologic pathways that are relevant for disease. As an industry, we have been very reliant on animal models to help inform which targets we pursue in human experiments. There are certain limitations to that approach that we think we can get around by using human genetics instead. We're very encouraged about what we're learning and very encouraged about how it's helped us reshape our R&D portfolio.

Today approximately three-quarters of our pipeline is informed by human genetic analysis. The best drug discovery begins when we have a fundamental, basic understanding of the biology involved in disease. As regards COVID, we recently completed a very interesting study with our colleagues in Iceland examining all of those infected on the island. What we did was take the coronavirus found to be present in any infected individual in Iceland and sequenced it to look very specifically at the RNA and the virus and to try to understand what we could learn about the biology of the virus and how it was spreading on the island during the early stages of this pandemic. Of course,

what we learned is that quite a bit of the infection was occurring as travelers returned to the island from other parts of the world, including from parts of the world that weren't considered risky at the time. The study underscores how important widescale testing is, and underscores how difficult it is to contain a virus like this, which is infectious and asymptomatic at the same time.

**Bob, for our listeners – Finland, Iceland, and other smaller countries have often served to provide the knowledge on how to treat individuals. Talk to us just for a few minutes about why Iceland?**

Yes, Iceland and Finland are two good examples of populations where human genetics has been very useful in trying to understand disease. In Iceland in particular, we benefit from the fact that it is an isolated island, so we have founder effect population. What that confers on us is an improved ability to find rare variants, and it is often the rare variants that are important to understanding disease.

We benefit also from the fact that the Icelandic nation is very interested in genealogy, so there are genealogic studies going back to the year 1000. And then we have national health medical records that we can use as well. So we can combine an understanding of heredity, medical records and genetics together in a way to try to trace the genes that might be relevant to those diseases that are moving through families – and then to ask questions about what we would have to do with a biologic therapy in order to recapitulate or block what we see happening in those genetic populations.

So from Iceland, what we'll be doing is looking for patients who've recovered from an infection, seeing which of those patients have expressed antibodies against the virus, and try to

see which are the antibodies are most effective in neutralizing the virus. Once we're able to do that, we would like to be able to manufacture those antibodies at scale and then potentially provide them as either a prophylactic passive vaccine for people who are at high risk of infection or even provide them directly to people who are in the midst of fighting an infection.

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We're working collaboratively with Adaptive Biotech in Seattle. Between Adaptive and our work, we think we have the right team for discovering the antibodies that have the potential to be most effective. So, we're excited about the collaboration. It's moving

incredibly quickly, which seems to be true of all COVID-related activities at the moment in our industry, but it's still early days.

**We hope that your work with Adaptive leads to these antibodies that can at least allow us to get back to a sense of normalcy. When we have these products – whether it's a vaccine, antibodies, antivirals, a new immunology agent, etc. – how do you decide, and on what basis, who gets access to a drug or a vaccine or an antiviral first?**

Clearly the demand for those medicines will be global. Clearly there are going to be parts of our global community that have less resources than the United States and Western Europe and our large partners in Asia. And the question is, what are we going to do as a society to make sure that everyone who needs access to these innovative therapies can get that access?

Certainly when it comes to a vaccine, Michael, we're all going to have to work together to make sure that those parts of the world which can't afford healthcare on their own or wouldn't otherwise be able to afford vaccines on their own are provided access to a vaccine. Fortunately there are well-established groups that are already well advanced in thinking about that topic. I'm encouraged that in the fullness of time we'll be able to address that. In the

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short term, I continue to be more worried about making sure that the industry has adequate supply of vaccines or other medical treatments that might prove effective against the virus. Again, I think that's going to require an extraordinary degree of close collaboration in the industry to make it happen. The good news is that that's the spirit of cooperation that exists today between regulators, companies in the industry, and nongovernmental entities like your own that are involved closely in working with both regulators and innovative companies like ours.

**The [Amgen Foundation](#) has done great work. With all the social disruption that's occurred, how have you focused the Amgen Foundation's efforts today?**

The Amgen Foundation has been really successful in funding innovative approaches to STEM education over the past a number of years, and – particularly now with so much remote learning going on – we're able to leverage that. We are the supplier of biology content to the Khan Academy and really excited about the extent to which that curriculum is being accessed now globally. We have literally millions of young students

who are reaching out to Khan Academy and going through their biology curriculum that we're excited to be part of.

We also recently launched with Harvard something called Lab Exchange, which also makes available to students – at the college level or high school level, even graduate student level – information on the sciences that are relevant to those who might be interested in pursuing a career in chemistry, biology, medicine, and the STEM disciplines. We have been an active funder of those areas, and fortunately we invested quite a bit of time and effort in trying to make that available for distance learning. And that's helping us out right now since so many of our young students are having to work from home.

**We can't thank you enough for your commitment to bringing the world of bioscience to so many young people who might change the world. Bob, I want to thank you for joining us today and on the 40th anniversary of Amgen. I want to thank you also for the commitment of your people, your teams, and what you've been able to achieve.**

Well, thank you, Michael. Thank you for having me and thank you for the incredible work that you and your family are doing for the patients and for the science that's required in order to help serve those patients.

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