

CONVERSATIONS WITH MIKE MILKEN



Jonathan Simons

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April 20, 2020

Mike Milken: Jonathan, thank you for joining us.

Jonathan Simons: It's a pleasure and a privilege, Mike.

Jonathan, for several decades now, you and I have been partners on a mission to end cancer as a cause of death, and your leadership in many ways has played a major part in breakthroughs. beginning in the early 90s the concept was, could we energize our own immune system to put our cancer into remission? And in the last 10 to 15 years that has occurred. What have we learned, and how does it relate to controlling COVID- 19.

There are 14 forms of human cancer which are foreign enough that if you energize, as you would say, your immune system – turn your own body against a foreign invader – our immune systems are far more powerful than chemotherapy or even radiation therapy to eliminate these diseases. Our

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immune systems were built to find these things, seek them out and then send in troops to fight them off.

The problem with COVID-19 is it's so foreign, and it works so quickly and can divide so quickly, that we don't have time. And having never seen it before, we don't have antibodies. So why cancer research is going to offer long-term solutions to the curability and the elimination of COVID-19 is we know most all of the working principles of how to build a better immune system out of this relentless billions and billions of dollar investment in turning the immune system on against cancers.

Many years ago, for so many people, cancer was a death sentence. Today, 15-16 million Americans and more than 100 million around the world are living normal lives that were diagnosed with cancer. You have done such a good job over the years of translating complex medical ideas, kind of like a translator at the United Nations at our scientific retreats. What gives you a sense of optimism that we are going to solve this problem in the next few months?

I'm so optimistic because you see in under six months this sort of extraordinary effort globally of different scientific approaches. That's one. So multiple ways of making antibodies to protect us with vaccines. And by the way, the biotechnology of these vaccines are not the Salk or Sabin vaccine for polio. They're much smarter in terms of how effective they could be and they have a much higher probability. They've been heavily de-risked scientifically in advance.

The second is we have so many medicines right now that are being tested.

The third thing that makes me optimistic is there has been an explosion on the internet. I read about two to three hours a day of shared data – so literally the volume, the global sharing of information. Today there's a clinical trial in Denmark that just got started on coronavirus – a German group used University of Michigan data that we funded on the TMPRSS2 gene. All of this work from basically test tube to patient in under four months.

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That's why I'm cautiously optimistic. But the terror should be real because this virus is biblical in the sense that it's indiscriminate. Just like cancer is indiscriminate. You could be well one week, have a fever the next week, and if you're unlucky and your immune system doesn't see it early enough, you could die from this in three weeks time. We haven't seen this for a century.

Almost three decades ago, what you were sequencing as a physician–scientist there at Johns Hopkins was a very time-consuming. A couple of decades later, you told me that a \$5,000 machine had one-million times the input of what you were doing as a leading scientist–researcher in the early 90s. Put some numbers around that for our listeners.

What would take a human being in the early 1990s a year to do can be read within hours. There have been over 300 different laboratories, all sharing information about the COVID-19 virus. We can tell you with enormous confidence that this virus really isn't mutating much. And interestingly enough, Mike, there's so much data that's of high quality, that another group at the University of Michigan that we've been funding at the Prostate Cancer Foundation has designed on a supercomputer two additional antiviral drugs just based on a better understanding of how this spike protein – or how the key of this virus – goes into the lock of the lung cell. And all that happened in the last two and a half weeks. We just have to get through the next few months because the things still take time to scale, let alone test.

There are serious unintended consequences affecting cancer patients today. In trying to slow down the treatment of some cancer patients, particularly concerned about compromising their immune system or whether you can delay elective surgery a week, a month, or two months to prevent the interaction of cancer patients with COVID-19 patients.

Yeah, that's a really good point. American society of clinical oncology now has guidelines for patients and for oncologists about where you can slow down treatment. And there's no question that ideal cancer care around the world has been highly impacted, where you are making the difficult choice of having to delay [treatment] rather than lose somebody who's been diagnosed with cancer to the virus simply by going into a hot zone. Most cancer centers around the world are in major medical facilities that have a lot of COVID-19.

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Jonathan, our mutual friend, Dr. Fauci, mentioned recently that the Administration is considering some kind of “immunity passport.” How might that work practically? What do you think of the idea?

I think it's absolutely the way we get people back to work. How it would work would be a card you printed out or a simple app on your iPhone. Since you can book an airline ticket on your iPhone, you should be able to simply show that you had a blood test, that

you have antibodies, that by all scientific evidence you basically were infected, probably were asymptomatic. It's your passport back to work or into society because you just can't spread the virus and we can't get there fast enough, but we're going to have to do an enormous amount of testing.

We haven't had a national call for patriotic participation in something like this. We're working with the Veterans Administration to pilot this for the VA, starting with cancer patients who, if they had a mild case, could go right back to clinic and be protected. But this is definitely the way forward.

There is a group at Stanford already doing this – Dr. Boyd and colleagues. There are 11 or 12 in front of the FDA of these different tests. The test at Stanford takes two days, but I can envisage tests like this would take less than four hours and you could get it at a drug store or grocery store. We haven't had enough American imagination about how to scale it fast enough, but the science of it is incredibly sound.

Jonathan, one of the things that's impressed me over the years is your humanity, with strong underlying religious beliefs. How do you view this crisis coming from the corona virus today in in that sense?

We're in the middle of an epic tragedy, but the consequence will be that humanity will rise up and, once and for all, we'll have a global strategy to stop pandemics. I think this is the last pandemic because we have most of the systems to do the surveillance, the testing, the development of the immune therapies. We just weren't coordinated. But I don't believe ever again the world, facing this existential threat, won't come together. I think if you're a medical scientist like me this is why we all went into medicine – for moments like this where we come together.

Last, I think there'll be – as you've argued – a deepened and enriched understanding that the most important thing is health for people. Public health is so important, and underinvesting in this is just unacceptable. And there's always going to be an unintended

consequence in science that's favorable in the long-term. If it weren't for HIV, we wouldn't have learned so much about T cells that we could put into cancer and make 14 forms of human cancer curable, treatable with immunotherapy.

I believe COVID-19 is going to bring forth tremendous new understanding about how to better use the immune system for diseases, like clearing Alzheimer's plaque and making

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cancers where the immune system doesn't work very well work better. We just have to get through the next few months and save as many lives as we can with all the science that we have.

Jonathan, as we've talked over the years, obviously every life is precious. The economic argument is that more than 50% of all growth, economic growth in the world in the last two centuries, can be traced to advances in public health and medical research. And I think you've given us a path here that solving this problem will prepare us in the future, and we sure hope you're right: this be our last pandemic. Thank you for joining us today, Jonathan.

Well, thanks Mike, and thanks for your amazing leadership in this area.
