MSCI

TRANSCRIPT

The Genomic Age of Medicine Comes to Market

Featuring: ***Brett Winton****, Head of Research at ARK Invest*

Adam Bass:

This is MSCI Perspectives, your source for weekly research insights as investors respond to the COVID-19 pandemic. I'm your host Adam Bass and today is July 16th, 2020. This week, while some investment strategies revolve around sectors, factors, or ESG, thematic investing is about identifying potential investment opportunities that STEM from macro economic geopolitical, or technological trends that may upend or transform the way people live and do business. Today, we explore the theme of genomic technologies and how they're set to disrupt the healthcare sector and beyond. To do so, we spoke with Brett Winton, director of research at ARK Invest.

Adam Bass:

Okay, so first Brett, thank you very much for joining us on the program.

Brett Winton:

My pleasure.

Adam Bass:

Now on Perspectives, we've been taking the opportunity to learn, of course, about the insights that researchers and analysts have found throughout the crisis, but we also have been gaining insight into the researchers themselves and like all of us you've had to deal with a new reality. What's been the biggest adjustment you've had to make?

Brett Winton:

Well, I have two children age three and six, so certainly them being at home has been a change, figuring out how to basically turn them loose into nature safely and let them get stung by bees and discover various things has been a little bit of a challenge, but relative to many others, we're extremely lucky.

Adam Bass:

And it's something that we're certainly all learning on the fly.

Brett Winton:

No, exactly. And it's, one of the things that we've seen within business is if you expand that to which companies have been most agile and responsive to this crisis, you'll note it's really the newer companies that have done better in terms of both changing the way that they're interacting with customers and just keeping the nuts and bolts of business going. We could hit a huge choppy patch where you have massive uncertainty, you don't know what people are going to be buying, you don't know how you're even going to be able to sell. And if you have modern tools, you can very quickly adapt those into those new condition sets. Whereas if you don't, it takes you a couple of weeks. A couple of weeks of sales is a big, big deal for a major company.

Adam Bass:

And those companies that are so focused and have that forward-looking technology baked into who they are, they're certainly at the crux of the research that you do. We'd love to talk about what you refer to as the genomic age of medicine. What does this phrase mean?

Brett Winton:

Sure. The reason we call it the genomic age is because it seems like we are on the verge of a discontinuous change in our ability to address biological systems that will impact everybody's lives and will be extremely commercially interesting from the companies pursuing it. To just back up a second, the two major technologies that are driving transformation in the health space are gene sequencing, which is the ability to read the genome inside your body, and gene editing and particularly CRISPR gene editing. The first is genome sequencing, so we all have inside our bodies, basically a recipe for how your entire body is constructed. It's your DNA. It tells you why your eyes are brown or green, it tells you why you have five fingers on each hand. And there's a copy of that in every cell in your body, we've known since the 1950s, the structure of what that DNA molecule looked like, we just didn't know anybody specific in particular recipe set until the early 2000s.

Brett Winton:

We sequenced the first human genome, meaning we constructed the entire set of letters that encode a human and it cost just under $3 billion and took about a decade to put the whole thing together. Since then, the cost have declined. And actually now today you can go to a vendor and you can get your own personal genome sequenced for roughly $600 in the US. The ability to actually understand how the body is constructed is really profoundly important to understanding how to fix the body.

Adam Bass:

The rapid drop in cost and time certainly speaks to more people being able to afford it and more companies and service providers being able to offer and learn from it. But is there a threshold up price point, if you will, that's important to cross?

Brett Winton:

There are certain price points that are more important than others. And if you look at the healthcare landscape and the landscape of diagnostics that exist today, things that we pay for today to understand what's going on inside our body, for instance, an x-ray or any kind of imaging study, blood tests, or a colonoscopy, or anything where we need to understand if there's something wrong in our body, those price points are in the thousand dollar and less category for the most part. So as gene sequencing has crossed that thousand dollar price point, suddenly a lot of diagnostic procedures that were available with old technology are suddenly under, call it threat of being displaced by a more modern technology that can tell you more about what's going on inside the body on a direct measurement basis.

Adam Bass:

All right, so that's gene sequencing. The second one you mentioned was gene editing.

Brett Winton:

The most well known example is CRISPR, which a specific molecule, so they can go along the DNA, they can latch on to a certain spot on that molecule, and then you can attach what's called a nuclease on the end of it, which could be, you can think of it as molecular scissors, but the key idea is that it can be directed to a specific part of your DNA, and then it can manipulate what happens right at that spot. And so between those two technologies, you have an unprecedented ability to understand what the body is doing, and then to directly manipulate what it's doing at that source.

Adam Bass:

Sounds expensive.

Brett Winton:

Like next generation sequencing, as we call it, CRISPR gene editing is also extremely accessible, and inexpensive, and provides researchers a lot of ability to run experiments. And so not only in the human

body, for example, they can create mice that have genetic mutations that are identical to the ones that they're trying to study in humans. And so the ability to very quickly be able to create a mouse that is expressing the gene mutation that you're specifically trying to study can then accelerate your ability to understand exactly what will work against that particular disease.

Adam Bass:

And we've seen that very recently, of course, with COVID where you found actually a direct line between, as you mentioned, gene sequencing and gene editing to the ability of scientists to identify the virus, diagnose it, and it's even played a role in the efforts to manage the viruses spread. Can you talk a little bit about that please?

Brett Winton:

Sure. One of the remarkable things about COVID-19 is how quickly we sequenced the disease. So knew exactly what it looked like at a molecular level within a matter of days, and that ability to quickly and inexpensively sequence the virus actually has helped researchers to understand where and how it is spread, because any RNA virus, it mutates over time and those mutations accrue at a certain rate. And so if you find a virus in New York, you can actually track back and tell whether or not that particular virus that was inside that person's body came through a European traveler since you know what the RNA of the virus looked like in Europe or via direct transmission from China. This can help both retrospectively understand exactly how the virus spread and it can also help in real time with testing and tracing efforts to understand whether or not a virus is being community transmitted or it's coming in from outside in some way.

Brett Winton:

Then on the gene editing side, I described how CRISPR can glom onto a certain of DNA. You could also attach some kind of fluorescent, so it would light off or change color if it gloms onto a certain section of DNA. And so you can actually infuse the CRISPR compound on a paper strip, and then dip that in the saliva solution that you think may contain the virus. And then it'll change color in a very short period of time if enough of those CRISPR molecules actually glom on to RNA that's consistent with the virus. Those paper strips can be very inexpensively produced as you scale them and they store very well, so you could potentially provide these to emerging markets.

Adam Bass:

Absolutely. And right now the implications obviously are how it can help in the search for a vaccine, as you alluded to.

Brett Winton:

Vaccine development is happening on an ultra rapid pace. There are a few entities that claim they're going to be able to demonstrate efficacy and have approval before the end of this year. And part of the reason why is they are actually using DNA and RNA directly to try to trigger the body's immune system response, to then protect against the potential infectious disease. None of that would be possible without A, understanding what the actual construct of COVID-19 is, and then B, having really good tools for doing synthetic DNA and RNA construction to create those vaccine entities sufficient to protect prospective patients against the illness.

Adam Bass:

And what's interesting with CRISPR, Brett, right, is that there are implications and uses even beyond medical ones, beyond the healthcare industry.

Brett Winton:

Exactly. There are applications within the research and development field, for instance, creating those mouse models more quickly. So you can accelerate research and development. And within things like agriculture, being able to create salmon that are able to be more successfully farmed. There's the opportunity to drive a lot of calorie yield for the same dollar spent against fish, which previously were being caught wild. There's probably a lot of juice to squeeze out of that salmon, I guess, in directly editing its gene to make it more amenable to calorie production for human. And if you look across the entire agricultural landscape, we believe that gene editing will actually deliver yield sufficient to keep pace with population growth, meaning we can continue to sustain expected population growth without devoting additional land to crop and agriculture, just with the yields that we expect from gene edited crops, livestock, and aquaculture.

Adam Bass:

Well, Brett, unfortunately we have to end it there. This is fascinating. Truly your passion is, you'll excuse me, contagious, but Brett, thank you so much for joining us. This has been a fantastic, very interesting discussion.

Brett Winton:

My pleasure.

Adam Bass:

That's all for this week. If you have a moment, we hope you'll subscribe to the podcast, leave a comment, or better still, share the podcast with a friend. And for more from MSEI check out the ESG Now podcast each Friday until next week. I'm your host, Adam Bass and this is MSEI Perspectives. Stay safe everyone.

About MSCI

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 45 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process. To learn more, please visit **www.msci.com**.