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**Announcer:** The *BioWorld Insider Podcast*.

**Lynn Yoffee:** This is the *BioWorld Insider Podcast*. I'm Lynn Yoffee, *BioWorld's* publisher. Complex manufacturing processes and supply chains have always been part of the biopharma industry story. Life-changing medicines are grown and synthesized across the world every day. Along the way, a multitude of contractors, regulators, and logistical challenges are involved, but no event has brought this piece of the industry into sharper focus than the COVID-19 pandemic.

To help us take a closer look at the issues the pandemic has raised, from API shortages and manufacturing mistakes to the rattled supply chains and fast-changing goalposts, we've invited Paul Testa, who is the Executive Vice President for Operations and Supply Chain at Tokyo-based Kyowa Kirin. Today, Kyowa Kirin is the eighth largest Japanese biopharma company by market cap, with nearly 2.8 billion in 2020 sales, with expectations that it will break 3.1 billion in 2021. Some of the company's biggest growth drivers are Crysvita, a monoclonal antibody for an inherited form of rickets, a long-lasting form of new Lasta for oncology indications, and Poteligeo, another mAb targeting two types of cutaneous T-cell lymphoma.

Paul has more than 30 years of experience in a mix of operational roles along the biopharma supply chain, including stints in manufacturing, operations, procurement, and management. Paul is on the line today with *BioWorld* Managing Editor Michael Fitzhugh. Over to you, Michael.

**Michael:** Fitzhugh. It's great to have you here, Paul. How are you?

**Paul Testa:** I'm great, Michael. Thank you for having me.

**Michael:** I'm so excited to talk about manufacturing and supply chains with you. It's not only that they're topics with special geeky appealed for me, but also because of how you're coming to it right now in really modern context with Kyowa Kirin, but also working for a company that has roots going back to Kirin Brewery all the way back in the early 1900s. Can you tell us just a little bit about the backstory of Kirin and how you came to join Kyowa Kirin?

**Paul:** Well, I think you've got it right. The backstory of Kirin itself does go back to Kirin beer. Most people that have traveled the world have a good understanding. For those that don't, Kirin is a name like Anheuser-Busch here in the US. It's a very long-standing, historical brand name in Japan itself. Over the course of time, Kyowa Kirin spun out of that because of the desire to get more into healthcare as opposed to maybe lifestyle brands or beverages. Kyowa Kirin has been working at the pharmaceutical and healthcare business for quite some time now.

Certainly, the growth that we've seen here in North America in the last several years has catapulted Kyowa Kirin as a healthcare brand into a much different place as it relates to brand recognition here in the US. It's been a fun journey. I joined Kyowa Kirin in the latter part of 2019 to create the supply chain and operations function here in North America. Previously, North America was treated by Kyowa Kirin as, if you will, all other businesses around the world, not unlike what we do in developing markets for US-based companies. Kyowa Kirin has really grown significantly here in the US over the last couple of years, and we've got an exciting future to look forward to as well.

**Michael:** Now, at that time that you joined, COVID-19, as we know it, hadn't really emerged on the world stage yet, right?

**Paul:** That's right, in the dark ages, if you will, yes.

**Michael:** [laughs] It certainly seem like light times by comparison to me. What were your priorities back then, and how did COVID's arrival change them?

**Paul:** Well, so the priorities back then were not drastically different, believe it or not, than they are today from a supply and operations perspective. In the healthcare business, all of my colleagues that work in pharmaceuticals, it's all about the patient. We really try to focus on the patient and the innovations that can continue to advance human healthcare via the medicines that we have to offer. For us, it was about continuity and reliability of supply and developing and implementing business processes and related automation, such that we could scale those business processes. A lot of those priorities way back in 2019 haven't drastically changed.

Certainly, there's an added layer of complexity with COVID and a lot of the intricacies of managing those details that we all deal with. We deal with toilet paper and food supply and building materials and all those other things, but the difference in healthcare is, well, there's a patient waiting. We can wait for toilet paper or building materials, but the patient cannot wait because their healthcare is at stake. We really try to layer in additional safeguards relative to continuity and reliability of supply. Those priorities haven't drastically changed over the last two years. Just some of the layers of complexity in terms of what we focus on and how we try to deliver those things have changed a little bit.

**Michael:** On the continuity and reliability front, I remember as the pandemic was really beginning, one of the first concerns that emerged in the US, but not exclusive to the US, was real concern about dependence on China for APIs, and other countries as well. What became of that concern? Did it endure? I'm not speaking specifically to Kyowa, of course, but just generally within the industry.

**Paul:** That's a great question. I would say, in general, I think it has endured global reliance on either API, active pharmaceutical ingredients, or other key components that make either a pharmaceutical, or in some cases, medical devices or other diagnostic-based products. Let's call it healthcare in general. When you first develop a product, you want to get the best source, but sometimes those excipients or those starting materials happen to be in parts of the world, not unlike some of the rare metal discussions that we hear about with Apple and other consumer-based products.

For pharmaceuticals, I think there was probably, and maybe still is, an overreliance on some of these starting materials, active ingredients, key excipients at the front end of the process. I think there's been a good amount of work to minimize the shorter-term impact. Then, more importantly, I think many companies have done a lot of work to really reduce those longer-term reliance on maybe less reliable supply sites, or maybe supply sites which may get tied up in geopolitical matters, not unlike China or maybe some other areas.

Now, we need to be a little careful, such that we don't turn this into a nationalistic supply chain discussion, because that's not necessarily helpful either from an innovation perspective. Certainly, I think we play different, if you will, war game scenarios about what the future may be and try to avoid some of those surprises that we should have seen coming.

**Michael:** My colleagues at *BioWorld* have written about both the US and India creating public-private consortiums to onshore manufacturing. Has that had any impact, and has that happened to any degree within Kyowa?

**Paul:** Not as much within Kyowa. I think that is something where we do have opportunities to take a closer look at them and potentially move forward. The easy public version of how we've mobilized around COVID vaccines had to do with some of the work that was done to accelerate, essentially, what was a government-industry partnership for, not only the data for the filing and approval of vaccinations, but equally the mass production of them.

If you think about what's happened over the last couple of years, we didn't know what COVID was, and now we have a vaccine and we also have subsequent boosters for it. That, what is normally a 5 to 10-year development and implementation process, was executed in, what, 18 months or so. That's incredible. I think that's a sign of what can be done when all of the parties work together as opposed to stay in their own lane and do the process that we used to have.

I do think a lot of those public-private partnerships, as proven in a time of emergency over the last couple of years, I think they do provide some promise for what the future could look like and maybe some opportunities. Now, from a straight-on supply perspective and/or capacity utilization perspective, those things are true as well. The easier example for me is that the innovation associated with, whether it be vaccine or medicine development, but equally the approval process in terms of the data that's required by government agencies to prove safety and efficacy of products.

**Michael:** You mentioned automation earlier, and so I draw a line from that, too, potential efficiencies and speeding up of process. As you talked about, the amazing rate at which things were able to come together early in the pandemic to make these vaccines possible so quickly. I was wondering, are there other elements of change within the manufacturing supply chain landscape that are forever different now, where there's been a shift in thinking that's enabled and could enable future speed at the rate that the response happened here?

**Paul:** Yes, that's a great question. There are probably other folks that might be better suited to speak about the details of manufacturing processes. I think it's many of the same things that I'll speak about, but just applied in a manufacturing plan, a bioreactor setting, those sorts of things. If we just think about supply chain, I think it's been well documented that the digital adoption curve, it hasn't really changed. It's just accelerated significantly. Our reliance on Amazon, or our reliance on Zoom or Teams, our reliance on so many of the online tools that we have been able to use to essentially live life "normally" over the last couple of years, those things are all automation related.

As it relates to supply chain, where is my product and when is it going to be delivered, and the exchange of data associated with that product in the healthcare space, all those things are very important. If we go back whatever, 25 years to use the exaggerated example, all that was done on paper. Well, now nobody wants paper. Bad things can happen with paper. Can get lost, can get damaged, there can be mistakes with that. If we can automate those processes, now we've significantly accelerated the journey of the product from whatever, the manufacturing site, through the distribution chain to the patient in this particular case.

The Amazon effect is alive and well in healthcare supply chain. There are many more layers of validation that need to be done in order to make sure that that can be done properly and effectively and the same way every time. Essentially, it's the same idea. Some of those automation pieces that I mentioned earlier, via conference calls or ordering groceries, the same sorts of things certainly apply in the healthcare product supply space as well.

**Michael:** I've been reading also in *BioWorld* that some of the inspections that have caused delays of reviews or even leading sometimes to complete response letters for products have been able to be facilitated by video calls now. Have you seen that? Has that had an impact? Do you think that that's going to continue in the years ahead?

**Paul:** I don't know if it will continue. I certainly think that there's more of an opportunity for that to happen. Again, we need to decide, okay, is this an ideal use of technology or is this an acceptable use of technology in a time of an emergency? I'm not sure about the last part, will it continue? We haven't directly seen that within our own company yet. We have done our own. Many of our own internal auditing processes have been continuing to run largely virtually, almost entirely virtually

Relative to regulatory agencies, FDA in the US, they have done some of that work, and I know they're working now to really try to get back on schedule as it relates to their normal inspection processes with companies like ours, a company like Kyowa Kirin, or other companies in the industry. I think there's a use of technology, but as like anything else, it needs to be fit for purpose and it needs to be done properly. Otherwise, there can be a significant loss in effectivity as it relates to how that process is executed.

I think there are some opportunities and I think it's worth, again, some partnership across the industry, and again, I'll say the manufacturers of the industry as well as the regulators of the industry. I think there are some opportunities in terms of doing some things a little bit differently that might result in a better outcome for everybody.

**Michael:** Turning to the supply chain side of things, another issue that's developed during the pandemic has been around enormous demand for vaccines or other drugs and diagnostics. It's sometimes spiking depending on what the current circumstances are. Various regions and countries seem to take different approaches to the uneven nature of demand for products over time. Is any coherent strategy emerging to deal with that uneven demand?

**Paul:** That's a great question. If you think about it, we started off with masks and then we got into vaccinations. Just the simple notion of, okay, there's whatever, 7 billion people on earth and therefore there's 7 billion glass vials that will be needed times two doses. That demand didn't exist two or three ago. As like anything else, manufacturers will adjust their capacity to whatever the demand is, but we need to try to estimate or project forward what that demand will be. That's very much a moving target at this point.

I think best-in-class processes have really tried to scenario plan what future demand might actually look like as it relates to-- in this particular case it's vaccine production, but it could be tablets that would be treatment for COVID. It could also be manufacturing capacity that has been allocated to the Defense Production Act. I think we're past some of those elements, but certainly there are other elements as well.

Not to get too supply chain geeky on you, but I do think that the good old-fashioned sales and operations planning process is one that tries to take a good look at what demand is projected to be. Any good S&OP professional would say well, "Well, but what could the demand be? Give me the absolute best case upside scenario, but equally give me the absolute worst case downside scenario." Then that at least gives us a little bit of a control chart in terms of what we should be planning for.

Now, again, we don't want to plan on the most optimistic scenario nor the most pessimistic scenario. I think we do need to have the opportunity to scenario plan each of those and try to better understand what would happen if those things came through. Similar to food production or personal products or healthcare, it's a similar process. It's one that the discipline of a good S&OP process, it's not glamorous and it's not sexy, but it does allow for companies like mine or like many of the other ones that we see and read about in the news on a day-to-day basis, it allows for them to better meet that demand that is, to your point, it can be very volatile in times when demand or supply can be disrupted.

Again, not sexy, but that good old-fashioned sales and operations planning process, which is supply chain 101 taught in a university setting, is very much appropriate for managing through these situations.

**Michael:** Beyond that skill set, as you build out your organization over time and as it evolves under your leadership, are there certain skill sets or areas that you foresee as becoming more important things that you want people to come to the table with when they're joining Kyowa or the industry in general?

**Paul:** In the time, as I said, I've created a function here in North America for Kyowa Kirin largely during the entirety of the pandemic. We've onboarded close to 20 individuals all virtually, and we've essentially built a full function supply chain organization in that timeframe. We keep coming back to the same non-technical skill sets. We need people that are good at the technical aspects of our business, or the supply chain planning or data analytics.

What we also need are people who can zoom in to the details of a situation and then can zoom out to put the details of that situation in the context of the business that we're in. We need people who can deal with ambiguity, because, as you know and we've been talking about for a little bit now, none of us have all of the data, and the data that we think we do have may not actually represent a good description of the situation as it might present itself tomorrow. Dealing with ambiguity is something that is so important.

Then, I think the ability to collaborate and communicate with colleagues, whether they be colleagues within our own company or colleagues outside of the company, business, general partners and even customers. That collaboration is so important to ensure that everybody is working on the same page or working to get on the same page. Then, the communication aspects of that, especially in a remote world, those elements are so important as well. There's probably a quick summary of some of the non-technical leadership-oriented skills that we've really tried to focus on in the last couple of years.

**Michael:** Fantastic. Paul, I think that one thing that I learn the longer I work for *BioWorld* is how little I know about everything. I'm constantly just doing my best to keep up. Are there elements of your field or elements of what's going on with Kyowa right now that you want to bring to the for as we wrap up?

**Paul:** I think a lot of people might not necessarily know so much about Kyowa Kirin. A lot of people, a lot of companies, especially in the healthcare space, a lot of companies like to represent the patient, "Here's what we're trying to do with the patient in terms of improving quality of life." We're not drastically different. We go a little bit further in terms of how we try to represent that. Essentially, we're trying to get to a place where we can make people smile, whether it be employees, or patients, or customers.

We really focus on a series of healthcare conditions that need better solutions. Some of us that have been through the, if you will, the patient odyssey I think we have a good appreciation for the fact that, to your point, the more we know about human healthcare, the less we actually know about human healthcare and how much more there is to do. We really try to focus on having a profound impact on patients' lives. That would allow for us to focus in the clinical and scientific breakthroughs, but equally in collaborations that can expand our impact.

Then, certainly, from an employee perspective, we really try to focus on not just those all elements, but equally we do a heavy dose of career development and accelerating skill development as well. The way I try to describe it to people, yes, it's all about medicine and it's all about patient outcomes, and innovation, and the commitment to life. That is one of our significant core values. It's equally about working in the space of integrity. Integrity for the patient and integrity of our processes.

The last thought I'll leave you with is, given our Japanese heritage, we have a good amount of emphasis on Wa. Wa in Japanese is this notion of teamwork above all else. That element of significant amounts of intentional collaboration really allows for us to focus as an organization on delivering for our patients in the space of our commitment to life and trying to have a profound impact on healthcare as it relates to our patients' lives.

**Michael:** Fantastic. Thank you so much for sharing your time with us today.

**Paul:** Thank you for having me, Michael. I've enjoyed our conversation.

**Lynn:** Paul, we really appreciate you sharing your excellent perspectives with Michael, me and our listeners today. Thank you. As always, *BioWorld* will continue to keep you informed of all the most important scientific, clinical, and business updates in the field. That's our show for today. If you need to track the development of drugs, turn to BioWorld.com, follow us on Twitter, or email us at Newsdesk@BioWorld.com. If you're enjoying the podcast, don't forget to subscribe. Thanks for joining us.

**Announcer:** *BioWorld*, published by Clarivate, is a subscription-based news service, but all of our COVID-19 content, more than 5,000 articles and data entries since the start of the pandemic, are freely accessible.

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