



INTIENT RESEARCH WEBINAR

VIDEO TRANSCRIPT

RICHARD HARRISON: Hello, I'm Richard Harrison from Accenture and I'd like to welcome everyone to our On Demand Video Series focused on the INTIENT Platform.

Today, we're taking a look at the INTIENT Research products suite. Some of the hurdles that pharma companies are facing as they try to connect data and insights within research and early clinical development and how Accenture's INTIENT Platform enables the collaboration, continuity and flow of information across the enterprise to help provide the right data, at the right time, to the right team. And at the end, we'll take some of your questions.

Let's start off with a couple of introductions. First, as I said in the beginning, I'm Richard Harrison. I'm a Senior Manager in our Life Sciences Practice and part of the INTIENT Research Team. I'm a 30-year pharmaceutical industry veteran, spending the majority of my time in the early phase pre-clinical drug discovery. And I hope that what you see today, you'll be able to see how what we're working on is going to help the industry move forward faster and get drugs to people in less time.

With me today is Joe Donahue. Joe is a Managing Director with Accenture's Life Sciences Business and he leads the Global Pharma Research Practice. Joe has more than 25 years of executive level entrepreneurial and Board experience in global life science and technology companies and private equity firms. Prior to joining Accenture, his role included Senior Vice President at BioReference Laboratories, the third largest diagnostics testing laboratory in the world. He was also Senior Vice President of Life Sciences with Thomson Reuters Intellectual Property & Sciences, as well as holding leadership positions in several early-stage life sciences research, informatic and analytic companies. Joel holds a degree in Medicinal Chemistry and Computer Science

from the Villanova University in Villanova, Pennsylvania.

And now, I'd like to hand it over to Joe.

JOE DONAHUE: Thanks, Richard. I'm delighted to be here today to talk about INTIENT Research. INTIENT Research is part of our INTIENT Platform that provides end-to-end connectivity of data and analytics across the pharma enterprise from research efforts through patient engagement. Each of the product suites, such as research, integrate and provide access to the capabilities and content relevant to those users. The suites run on a common set of services or capabilities built on a Google Cloud environment. Let's get into some of the details of INTIENT Research.

A little over two years ago, based on requests from a number of our pharma clients to help them address the informatics challenges supporting discovery scientists. We talked to heads of R&D, IT and research in just over 40 pharma and biotech companies, to understand exactly what those challenges were for both researchers and research IT staff.

This slide summarizes the feedback we received. There are really two key takeaways for me here. First, the research informatics environment is currently a complicated one with lots of inputs that need to be connected. Think of research as the wide end of a funnel. There are more internal data repositories, external collaborators, vendor technologies and content providers that need to be linked together than anywhere else in the drug R&D process.

Today, all these data sources and vendor technologies aren't well-connected in most companies. Where they are, it's up to the R&D IT teams to do the work and maintain it.

Second, the environment is getting more



complex every day. There are more collaborations, vendors with new AI algorithms and analytics that researchers want to try out and new content sources we need to be able to easily integrate.

At the rate science and technology are advancing, generating even more data and apps from new sources, there is a need to develop a better approach.

With that background, we set the following North Star vision for ourselves. To effectively support and give confidence to discovery scientists in generating informed hypotheses, leading to the discovery and development of new drug candidates.

To achieve that vision, we had to figure out a way to enable access to comprehensive, internal and external experimental data and analytics that would help drive insights in pharma discovery.

And to help achieve it, we recognize the importance of creating a partnership ecosystem or network with the consumers of data and informatics capabilities, the pharma, biotechs, CROs, etc., on the right-hand side and the providers of those technologies and data on the left-hand side could easily work together.

Think about the smart phone you're using today, where you can easily plug in a new app or capability and the data flows seamlessly from one app to the next. There's no programming you have to do to connect your applications and data together.

So let me turn it back to Richard to take you in a demo of some of the platform's capabilities and then we'll see if we have any questions when he's done that we'd be happy to answer.

Richard, back to you.

RICHARD HARRISON: Thanks, Joe. What I'm going to do today is by way of demonstration, show you how we can use the INTIENT Research Platform and able to identify potential drugs that could be used as treatments for COVID-19.

So in order to do that, what we'll do is launch our Data Explorer. Now, what our Data Explorer will do is we've identified a number of targets that we know are important in the pathogenesis of COVID-19 infection. So we've been able to amass a database of 40 million different records from places such as PubMed and the COVID-19

challenge and the KINDLE database, as well as being to assemble a lot of pieces of information that usually sit behind paid firewalls, but have become available due to the COVID-19 situation.

And we've taken all that data and pulled it together into one place and we're now going to interrogate that as a way of identifying these drugs. So what I've done is I've preloaded a number of targets and you can see the targets are actually listed on the left-hand side here. And these targets are picked for a variety of reasons.

For example, one of the targets is kinases and we know that kinases are involved in the site of client's storm that occurs when people get infected with COVID-19. Another one we picked is ACE2, angiotensin-converting enzyme 2 and we picked that one because we know the spikes on the Coronavirus bind to ACE2 and that's how it infects the cells. So we're going to use those two as examples of finding ways that we can help identify new drugs.

So you can see, as I said, on the left-hand side are a number of different drug targets and we'll use these little pie charts over here to sort of narrow down the information there. So, for example, I only want humans. I don't want to get information from animal species. And since I'm trained as an enzymologist, we're going to start out looking at some enzyme targets.

So as you can see, as I'm clicking through, we get updated information. So the first thing I would like to do is take a look at the literature over the past six months on those different targets. And to do that, I simply highlight over here and I bring up the particular literature and then you can see I get a table that has the literature references, where they've come from, whether it be clinical trials or PubMed and the dates associated with those.

So I can then go in there for any one of these and I can find the information, can see whether or not it's something I'm interested. So here, for example, is something that talks about ACE2 and COVID. So I can come in here and look at that, as I mentioned earlier, because many of the publishers have made their information freely available. I think I'll pull up that journal article and be able to get myself caught up on what's going on in the literature in that particular area.

Similar to what I did with the literature, I want to know what's going on in clinical trials. And, once again, I highlight that area. I can view those and actually bring up all the different trials that are going on and if there's a particular one I'm interested in so, for example, here's one talking about ACE2. I can go to the source and bring



that up and learn what's going on with that trial and all the information associated with it and the reasons behind why that trial is being brought up in the first place.

So once I familiarize myself with the literature and with the clinical trials that are going on, the next thing I want to do is remind myself with the biology of what's going on. So, for example, if I was interested in looking a particular kinase and this happens to be JAK kinase. I can actually follow this biological pathway map where it starts out with the first interaction between the kinase and how it translocates a signal all the way across all the other proteins, all the way into the nucleus. And, therefore, any one of these little boxes that has another particular protein in there, maybe another target I want to look at and any drugs associated with that and could be interesting drugs for repositioning for COVID-19. So now I've gathered a variety of targets through a number of different things and I want to go in and I want to take a look at can I identify drugs associated with those targets? So to do that, we're going to pull up our knowledge graph here. And the knowledge graph goes into those 40 million records and in orange in my knowledge graph, those particular targets that you see on the left. And in blue, are any drugs that are known to bond to those targets and those could be potentially positioning drugs.

So I'll just take a set of those over here right now and we'll take a look at those in a little more detail. So we'll go out to my database with chemical compounds which in my particular case is Kaval and it'll bring for me the structures and associated physiochemical properties, so I can see what phase they've been in. I can see salability, (inaudible). I can see whether or not they're drug like substance through a Lipinski Rules, polar surface area, gives me an indication of whether or not they'll be self-penetrant, which is what I would need for kinase type inhibitors. So there's a variety of chemical information there I can use as well as structures. And you can see we've got about 20 of them here, so that we may want to take a look at. The other thing that's quite interesting is if there's a particular compound that I'm interested in, I may want to find out if it has any other nearest neighbors in my database by doing similarity searches. And you can see here for that particular compound, I can pull up a number of other chemical series. The nice thing is, I can set my criteria and depending on how stringent I want to make it, I can have only the drug itself show up or I can do it about 70% similarity against similar compounds.

If I like those, I can add those to my compound list as well. Once I have a compound list, I feel comfortable with, the next thing I'm going to want to do is see whether or not these are going to be toxic. So what I'll do is in collaboration with one of our partners, Vyasa, is we'll go in and do a predictive toxicology model on those particular compounds. So here, what we've done is we've taken the 8,000 known compounds or compounds of known toxicity and we've pretrained a model using deep learning and using AI to be able to say, if a compound will or will not be toxic based on its chemical structure. And the key to this now is that each one of these little hexagons represents either a chemical structure or a class of chemical structures. For example, these have cyclobutane in all of them and, therefore, they're considered to be similar. But what's important is if you look on the bottom, anything in red will be predicted to be toxic. Anything in blue will be predicted to be non-toxic. So, for example, compounds such as these would be predicted to be toxic and I probably don't want to go too much further with them when I'm doing my analysis. If I want to learn more about them or if I want to study them in a little greater detail, I can certainly take that information and bring it over to another piece of software where I feel more comfortable taking a look at them.

So, for example, here, I took them to Spotfire and how you start interrogating these and saying, I only want compounds in Phase 3 clinical trials, for example, or something like that. So once I have all my compounds and I feel very comfortable, the last thing I'm going to do is I'm going to ask my database to find drugs. And this is going to launch what's called a BERT search. A BERT search is it takes all of my information that hasn't been known as a curated and it actually trains itself on that information such that when I have unstructured information, I can find a lot of the information in there that I need. So what I found coming up here, I just found a number of different drugs that are currently in clinical trials for COVID-19. Things like fibronectins and the ACEs and Rs and many of the things you would expect and some of the ones you wouldn't expect, kinase inhibitors and whatnot.

So now, I might want to add a few more of those to my compound collection. And once I've got a collection of compounds that I feel confident with and I want to move forward with them, the next thing I would do is take those and I would bring them over and I would request biological



assays on those compounds or I may want to do automated synthesis on those compounds or I may want to do inventory management. There's many different opportunities of things. I may want to get a sample analysis on those to find out whether or not the compounds are still working the way they're supposed to be working. So I think at that point, what I've been able to do and show you in the last few minutes is I've been able to take a list of potential targets for COVID-19 and take them from a variety of sources. I've triaged those targets to find the ones most likely to be involved in disease progression and I did that using information from places such as PubMed in clinical trials in the COVID-19 database.

I was able to identify additional targets using those biological pathway maps. And then once I have my targets, I was able to identify potential drug candidates from my corporate repository, which in my particular case was Kemble. I employed similarity searching to expand that list. I used AI and natural language processing to increase that list of targets via that BERT search and then I employed deep learning to lead out potential toxic compounds. And then, finally, I used my request management system to check the inventory and all the assays. I think I'll stop there and hand it back over to you, Joe.

JOE DONAHUE: Thank you very much, Richard. That was a great demonstration of the power of the platform and the potential it has to help drug discovery scientists access their data and analytics wherever they exist to make better decisions faster.

RICHARD HARRISON: Thanks, Joe. We've had a few questions come in. Would you mind answering a few for us?

JOE DONAHUE: No, that's great.

RICHARD HARRISON: Good. The first question is, can INTIENT flex to integrate what other software solutions and external databases that companies may be using?

JOE DONAHUE: Absolutely. That's a basic premise of the platform and the INTIENT Network are able to do so through the standard APIs or Application Program and Interfaces that are part of the platform and that we're making available to all the organizations that are part of our INTIENT Network.

RICHARD HARRISON: I have another question for you as well, Joe. What if I'm not using Google

Cloud?

JOE DONAHUE: That's a pretty common question. The reality is that many, if not all, organizations have their data in multiple locations and the research suite has to access data and analytics often in a hybrid cloud environment. The best way for us to detail how that would work for organizations is for them to sit down with us and help us understand the specifics of their exact environment and then we can figure out how to access their data and their analytics where it exists.

RICHARD HARRISON: That's a great answer. Thanks. And then I have one question which is on probably everybody's mind and that is how will INTIENT help us take advantage of some of the new machine learning, AI capabilities?

JOE DONAHUE: That's a great question. What we're finding is that researchers, data scientists and the IT staff supporting them are excited to use AI and deep learning algorithms from multiple sources to help them and cover new insights in their data. Whether those algorithms are licensed, come from research partners, are native to the cloud environment they're using or are developed internally, the biggest challenge to making effective use of them is getting the right data organized ahead of time.

INTIENT helps in two ways. First, by rapidly organizing all the data to be analyzed. And second, by making that data available through standard data access APIs or application programming interfaces, that allow scientists to easily plug in whatever AI or deep learning algorithms they want to use.

RICHARD HARRISON: This is really great and I'm really looking forward to watching this as it evolves. Well, I'd like to thank you again for spending time with Joe and I today. We've included our contact details here, so you can connect with us and learn more about how we're helping our clients discover new insights that lead to better patient outcomes even faster than ever before.

Have a great day everyone. Thank you.

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