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The healthcare industry is at a pivotal juncture, driven by the convergence of data, technology, and a growing need to strengthen supply chain resilience, reduce costs and optimize operations. Meanwhile, patients increasingly demand more personalized, convenient, and transparent care, while payers and better patient outcomes. This is where robust, actionable real-world data (RWD) and real-world evidence (RWE) can drive success. They provide critical insights into market demand, product performance and operational efficiency, enabling suppliers to anticipate needs, improve quality and

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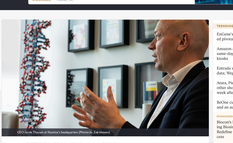

CEO Jacob Thaysen (Illumina) | Nadiyna Kizyma | Shutterstock, Jim Hurwitz

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ENDPOINTS IN FOCUS

Illumina was built on DNA. Its future could be biology's next big wave

Jared Whitlock
Feature Editor

SAN DIEGO — At the headquarters of Illumina last week, CEO Jacob Thaysen founded up a conference that mimics a DNA strand.

The architectural flourish at the company's campus is a representation of just how fundamental DNA sequencing has been to Illumina since it was founded in 1999. It has become a fixture in labs that use its gene-reading machines to discover drugs and diagnose patients.

Thaysen took the CEO job 18 months ago with a mandate to make major changes. And in an overlook atop the building's DNA-shaped staircase, he spoke with *End points* News about his plans for Illumina beyond just genetics.

While DNA is still core to Illumina's business, Thaysen has bet that the company needs to expand further into what's known as multiomics — a hazy field that includes decoding proteins, RNA and other elements of biology.

"Illumina has over the last 20 years really been driving the genomics revolution. The company is super proud about that," Thaysen, 49, told Endpoints. "But what we've also seen is that biology is, of course, much more complicated."

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Setting the Stage: Healthcare systems across the world are under growing pressure—from rising costs and increasing disease burden to persistent gaps in access. Addressing these challenges at scale requires scientific innovation alongside integrated, efficient models that deliver consistent sustainable access and affordability across the continuum of care. Having spent nearly three decades helping build Biocon's global capabilities, I have seen firsthand the responsibility that comes with scale and scientific excellence. Inspired by our founder Kiran Mazumdar-Shaw's vision that access...

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It's an urgent problem not just for science, but for Illumina.

Thaysen joined the company in September 2023. The previous CEO was pushed out by an activist investor, after antitrust regulators blocked Illumina's $8 billion acquisition of the cancer-testing firm Grail.

In his first year and a half, Thaysen steadied Illumina by unwinding the Grail deal and pushing to simplify the DNA analysis business.

But he's now facing a fresh series of challenges. Drug giant Roche is entering Illumina's main market for DNA sequencing. China has banned sales of Illumina's DNA sequencers, in retaliation for President Donald Trump's tariffs. The administration is also threatening billions of dollars of NIH funding that's critical for many of Illumina's academic customers.

And some of Illumina's former employees have left for their own startups dedicated to multiomics.

"You can sit on the sideline and eat the popcorn, or you can go in the arena and be part of the solution," Thaysen said.

Beyond DNA

When scientists finished a rough draft of the human genome in 2001, researchers predicted that the genetic basis for all diseases would soon be unraveled, leading to an explosion in cures.

Illumina helped turn that vision into reality, slashing the cost of sequencing and enabling breakthroughs in cancer diagnostics, rare disease treatments and other fields. And the company thrived. Since its 2000 IPO, Illumina has grown from revenue of $1.3 million to $4.3 billion in sales last year.

Yet the vast majority of genetically-driven conditions still don't have effective therapies. Many diseases, such as Huntington's and certain cancers, involve intricate biological interactions that DNA alone cannot fully explain.

"There's many things that we've discovered from genetics, but it can be very challenging to figure out what a genetic variant means and which variant is having a clinical impact," said Heidi Rehm, the chief genomics officer at Massachusetts General Hospital and a researcher at the Broad Institute.

That's where multiomics comes in.

One of those so-called 'omics, transcriptomics, helps parse how genes are turned on or off, giving a look at how gene expression patterns might cause disease, or help treat it.

Another layer is proteomics. Typically, scientists break down proteins into small chunks, identify them using a machine called a mass spectrometer, and then analyze how the proteins interact. Improvements in proteomic instruments — and artificial intelligence — have made it possible to monitor the vast number of proteins in the body in real time, versus the relatively static look that DNA offers.

Another field called spatial omics visualizes molecular landscapes in their native environment. Researchers can see not just what genes or other molecular elements are active, but where they are active, to track how diseases like cancer progress.

In combination, these and other 'omics promise to untangle the cascading biological effects driving many diseases.

"Illumina changed our understanding through our customers, of course, of genomics and DNA. We're going to see that over the next 10 years on epigenetics, proteomics and many other things," Thaysen said.

Getting off the sidelines

Originally trained as a physician, Thaysen ended up in life sciences, eventually as a senior vice president at the diagnostics company Agilent. There, he oversaw a division responsible for analytical instruments, informatic solutions and cell analysis products. The experience made him adept at spotting commercial opportunities.

At Illumina, he refocused the company on selling DNA sequencers to labs and hospitals. He also quietly made multiomics more of a priority, despite his admission that he's "not an expert in biology."

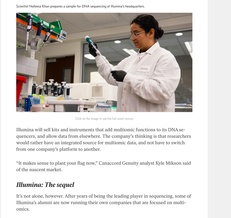
That included several multiomics acquisitions: In late 2023, Illumina acquired the startu Fetim Partek for an undisclosed amount; seven months later, Illumina bought the cell analysis company Fluent BioSciences for $85 million.

In February, Illumina detailed a series of multiomics technologies. Next year, the company is slated to release a product that maps the spatial positioning of millions of cells and their individual functions.

Jasmine Plummer, director of the Center for Spatial Omics at St. Jude Children's Research Hospital, got early access to that product to take a granular look at how prostate cancer resists treatments.

Further experiments could help stratify patients according to which are likely to benefit from certain medicines. Plummer said the research wouldn't be possible with just DNA sequencing.

"We could previously give a picture of the tumor, but now we can zoom in on a house of interest and tell you who's inside it," Plummer said.



Scientist Stefania Elias prepares a sample for DNA sequencing at Illumina's headquarters.

Click on the image to see the full-sized version

Illumina will sell kits and instruments that add multiomic functions to its DNA sequencers, and allow data from elsewhere. The company's thinking is that researchers would rather have an integrated source for multiomic data, and not have to switch from one company's platform to another.

"It makes sense to plant your flag now," Canaccord Genuity analyst Kyle Mikson said of the nascent market.

Illumina: The sequel

It's not alone, however. After years of being the leading player in sequencing, some of Illumina's alumni are now running their own companies that are focused on multiomics.

Among them: Illumina's legendary former CEO Jay Flatley, who now chairs the board of the Bay Area-based company Cellanome. (The company's CEO is also a former Illumina employee.)

"Multiomics is something that everyone aspires to," said Flatley, who ran Illumina from 1999 to 2016.

Founded in 2020, Cellanome is developing an automated platform that measures cell behaviors, interactions and functions. Flatley said the company will complement Illumina's offerings.

"If we're successful, it will cause Illumina to sell a lot more sequencers," Flatley said.

Others are competing. Element Biosciences is based less than 10 minutes from Illumina's headquarters, across the 805 freeway and a canyon.

CEO Molly He, a former Illumina employee, said Element initially focused on DNA sequencing, what she called a "trojan horse" for plans to catalogue a wider set of biological data.

Last year, Element released a machine that generates multiomic data via a relatively seamless process — which the company says saves time, money and cuts down on biological noise from stitching together so many data sources.

"Element is the only company with a fully integrated workflow coming from the same sample, from the same machine," He said from a conference room at 38th parallel company.

Another competitor, Newark, CA-based Ultima Genomics, is prioritizing low-cost sequencing, and unlike others, readily looking for multiomic partnerships.

"We've taken an open-platform, best-of-breed approach," Ultima Genomics CEO Gaël Almogy said. "We're not saying, 'Come to us and get everything from us.'"

In January, Ultima secured a key role in the UK Biobank Pharma Proteomics Project, a major initiative that could reshape drug discovery by uncovering new leads for drug targets and diagnostics.

In the first half of this year, Illumina is slated to release its own protein-measuring product, as part of a deal with the company Standard BioTools.

The partnership is an acknowledgment that Illumina can't do everything itself in multiomics. As much as Illumina wants to be an all-in-one provider, the company is incorporating others' technologies where it makes sense.

"We need to better embrace the ecosystem," Thaysen said.

To some, Illumina's recent deals in multiomics look like an attempt to reengineer the moves that made the company the dominant DNA player.

In 2007, Illumina acquired the company Solexa, a company that developed "sequencing by synthesis" — an ingenious method that uses fluorescent tags that bind a specific color that corresponds to key DNA elements. Illumina has continuously improved on the technology, a winning formula.

"Every time another technology-platform shaker sneaks up and you finally think, 'OK, there's now competition with Illumina,' turns out Illumina has been working on the next thing for 18 months, and they leapfrog again," said Stephen Kingsmore, the CEO of Rady Children's Hospital in San Diego.

That said, multiomics is much more scientifically complex than DNA sequencing, encompassing a range of fields with a range of competitors.

'You own it'

Wall Street analysts had credited Thaysen with steadying Illumina after a difficult period. But he hasn't won them over entirely.

Illumina's stock price now trades at about $85 per share, or a 35% drop from this year's start. Last month, Doug Schenkel, an analyst at Wolfe Research, expressed frustration during an earnings call that Illumina wasn't doing a better job responding to competition and actions from the Chinese government to restrict the company.

"I recognize you inherited a lot of problems from the previous leadership team, but once you buy the house, you own it. This is your company," Schenkel said. "It seems like every quarter, there's something new."

He's not wrong. In February, Roche detailed plans for a DNA sequencer with multiomic capabilities. Unlike other startup competitors, Roche has deep pockets and even deeper experience in healthcare.

Thaysen doesn't believe Roche will be able to match Illumina's comprehensive solutions.

"Competitors coming in with a large commercial organization have an advantage there, but fundamentally, you need first and foremost to be able to provide the solution that the customer wants," Thaysen said.

Through a spokesperson, Roche declined to comment.

Then this month, China — which makes up 7% of Illumina's sales — banned imports of Illumina's sequencers. The move was widely viewed as retribution for Trump's tariffs, along with Illumina's lobbying last year on failed US legislation that would have banned its Chinese competitor MGI.

Asked if China's ban could be reversed, Thaysen said the company is part of a "broader situation." After China's announcement, Illumina announced plans to cut $100 million in spending, and said multiomics would play a key part in plans to grow revenue by high-single digits in 2025.

Asked about these challenges during the interview, Thaysen responded that "no transformation is a straight line. There's ups and downs."

All of which seem like a potential distraction to the company's new strategy. How can the company reduce expenses, push into multiomics and all the while stay focused on DNA sequencing?

"It's a good problem to have a resource allocation issue — that you have more opportunities than you have resources. The alternative would be worse," Thaysen said.

And as for whether Illumina will one day build an architectural feature at its headquarters as a tribute to multiomics?

"We'll see," Thaysen said.

AUTHOR

Jared Whitlock
Feature Editor
jwhitlock@endpointsnews.com

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Shreshan Tambe
Chief Business Officer & Managing Director, Biocon Limited

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