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Biotech Cartography: Can An AI Tool Pinpoint The Next Big Thing?

by Lucie Ellis-Taitt

Created by Steve Lehmann, director of venture operations at Portal Innovations, Stargaze is an artificial intelligence platform that maps the structure of biotechnology innovation and uses that knowledge to identify fruitful startups.

Steve Lehmann, director of venture operations at Portal Innovations, describes himself as a "startup midwife." Prior to joining the VC firm, he led the George Shultz Innovation Fund at the University of Chicago, where he invested in academic spinouts.

"We create biotech infrastructure where none existed before," Lehmann told *In Vivo*, outlining Portal Innovations' strategy. This includes physical infrastructure, such as fully equipped labs, as well as investment infrastructure.

The 'Stargaze' tool was developed around three years ago. It uses large language models to identify potential biotech innovations the VC would want to invest in. The tool is able to read through millions of journal articles, patents, clinical trials, startup data and investor data - looking for "signals in these data."

Portal, led by CEO John Flavin, was founded in 2020 with an initial focus on growing biotech companies out of academia in Chicago. The group has since expanded into Boston and Houston.

Behind Stargaze

Lehmann explained: "The breakthrough idea for us is that papers, patents, people and clinical trials, they can all be plotted like stars in the sky. Once you've plotted the data, you can put the points into galaxies, clusters and constellations. And you can see how those environments are changing."

"The James Webb telescope can point at a particular part of the universe and say how it is

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composed based on what we know about the universe," Lehmann said. "We do the same thing for biotech innovation."

The VC uses the AI tool to reveal trends that predict innovation. The data analysis allows it to "predict new innovators." Lehmann believes Stargaze is one of the first AI tools to reach this level of analysis to be able pinpoint investment bets. "It's really hard to connect all of the data." He added that the technology to connect the right information and make use of that output has only recently become available, with the greater availability and understanding of generative AI and large language models.

Partnering With Big Pharma

In terms of practical uses, beyond identifying investment opportunities for Portal, the VC firm has out-licensed the tool to a pharma partner. "We just worked with one of the biggest pharma companies to look at a space of interest to them, to tell them what's coming next, who is interesting, who they should we work with and what they should we be scared about."

Lehmann also highlighted that Stargaze was being used in a deal with another multi-national pharma company to identify potential assets that could align with its recently approved drug, in order to build out a franchise opportunity. "They want to look at where to expand their asset and also at bundling other assets. They can also use [the tool] to get a sense of what's coming and how they might expect the therapeutic space to evolve."

Portal's investment strategy and its pharma partnerships work hand-in-hand. "When we're making investments, we want to make sure that those investments are in startups meeting a medical unmet need and that they meet the appetite of investors. We don't have enough money to take everything to the finish line. We need to partner with people along the way."

He added, "We want to know that the asset is going to meet a need and fit into a pharma pipeline because that's ultimately how we get liquidity on our investment," Lehmann said.

Having Portal use the technology for its own purposes is a way to validate the tool. "From a pharma perspective, they also want to know that we're not just feeding them a bunch of people who walk in the door. They want to know that the information has been vetted through multiple angles."

Portal's venture investments include companies such as Cardiosense, a digital biomarker platform using multi-sensor devices and proprietary algorithms to detect early signs of disease and guide personalized therapy; and March Biosciences, a clinical-stage company in the cell therapy field focused on developing CAR-T cell strategies to address hematological cancers.

The current wave of machine learning technology is critical to future growth of the biopharma

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sector, Lehmann believes. "Machine learning is absolutely critical to pharma companies and they need to figure out how to implement it. There's a mix in the market between those who want to do that all on their own, those who want to partner that capability off, and those who want a mix of both."

What Next?

"There are people with diseases for which the solutions are gathering dust in labs. Our goal is to get the ones off the shelf that have the potential to cure the diseases, get them venture funding, get them pharma partnerships, and turn them into drugs. That's the big vision," Lehmann said.

With Stargaze, "we can actually see what's sitting there on the shelf."