



Alamar Biosciences Prepping Proteomics Platform for 2024 Launch

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Premium

NEW YORK – Proteomics firm Alamar Biosciences is preparing its NULISA (NUcleic acid-Linked Immuno-Sandwich Assay) platform for an early-access release later this year and a broad commercial launch in 2024.

This week, in a *BioRxiv* [preprint](#), the Fremont, California, company provided the most detailed description of its platform to date, including its underlying technology and performance.

The NULISA system is based on the proximity ligation assay (PLA) originally commercialized by Olink Bioscience, the forerunner of Olink. PLA uses pairs of antibodies attached to unique DNA sequences to detect proteins of interest. When the antibodies bind to their targets, the attached DNA strands are brought into proximity and ligated, forming a new template that can then be amplified by rolling circle amplification.

PLA has been in widespread use for more than a decade. According to Yuling Luo, Alamar's founder, chairman, and CEO, the NULISA approach improves upon the standard PLA method by using a two-stage wash and capture workflow that reduces assay background, thereby improving its sensitivity.

As in traditional PLA, affinity agents linked to barcoded DNA strands bind the target protein, bringing the DNA strands near each other and enabling ligation. The strands produced by ligation are then bound via DNA hybridization to magnetic beads featuring oligos complementary to ligation products. These beads are then washed to remove unbound detection antibodies, and a low salt buffer is added to release the DNA-protein immunocomplexes from the beads. These immunocomplexes are then incubated with another set of beads featuring streptavidin, which binds to a biotin moiety included in one of the strands of barcoded DNA, allowing for a second capture step that, Luo said, significantly improves the assay's signal-to-noise ratio.

PLA is capable of capturing single protein molecules, Luo said, noting that this meant it was difficult to improve the assay by boosting its sensitivity of detection.

"In order to further improve the sensitivity, you need to suppress the background," he said.

Luo said the approach was inspired by the RNAScope technology he previously invented, which similarly aimed to boost the signal-to-noise ratio of RNA *in situ* hybridization assays. Luo founded Advanced Cell Diagnostics (ACD) to commercialize that technology, which Bio-Techne [acquired for \\$250 million](#) in 2016.

Luo said Alamar plans to compete in the mid- and high-plex, high-throughput proteomics market currently dominated by Olink and SomaLogic. He said that the NULISA platform could theoretically deliver extremely high levels of multiplexing and that the company has developed the barcoded DNA sequences needed for multiplexing up to 6,000 protein targets per experiment and has internally done

experiments multiplexing 500 targets at a time. The company's DNA barcodes also incorporate sample-specific identifiers, so DNA from a 96-well plate of samples can be combined to read out the NULISA results.

Sourcing or developing high-quality antibody pairs for its assay will be the major challenge with regard to multiplexing, Luo said. SomaLogic's SomaScan platform currently measures 7,000 targets, with an expansion to 10,000 targets planned by the end of the year. Olink's Explore platform measures around 3,000 protein targets, which the company is in the process of expanding to around 4,500 to 5,000.

Luo said that upon launch, Alamar's NULISA platform will feature assays to around 200 proteins and will focus on inflammation, an area where the company believes its system's sensitivity will prove a significant advantage.

Alamar has not yet published peer-reviewed data on the system's performance, but in the preprint, it compared its 200-target inflammation panel to Olink's Explore 384 inflammation panel and found that the NULISA system showed superior detectability for several low-abundance protein targets.

Holden Maecker, professor of microbiology and immunology at Stanford University as well as the director of its Human Immune Monitoring Center, said that in a trial Alamar ran for him comparing NULISA to the Olink and Luminex assays his center commonly uses, the NULISA platform showed higher sensitivity "for a fair number of analytes."

Maecker said that he "had some doubts initially," but that the results from the comparison have made him "strongly consider beta testing" the platform.

Olink did not respond to requests for comment on the results of the comparison.

Maecker said that beyond the system's sensitivity, the fact that it comes packaged as an automated platform is attractive, especially given that PLA has historically been a complicated process.

"I thought, this is going to be a hard protocol," he said. "But they actually have a fully automated system where you basically load your plate with the samples, load the reagent tray, hit go, and walk away more or less. That takes the complexity out of it entirely and gives you a very easy, standard workflow."

Maecker added that the roughly 200 assays in Alamar's inflammation panel are more than double the number of inflammation targets that the Stanford immune monitoring center currently offers on the Olink and Luminex systems.

Luo said Alamar has launched a technology access program where customers can send samples to the company for it to run. He said it has done work thus far for seven or eight major pharma companies and a number of top academic centers, though he declined to provide specific names.

In its preprint, the company also presented data from a collaboration with researchers at the University of Bonn's Institute of Innate Immunity, using the NULISA platform to characterize the host response in patients with mild cases of COVID-19, finding a "robust and sustained" interferon response that Luo said previous studies in this patient population had not consistently identified.

Luo said that in addition to multiplex assays, several of the company's technology access program customers have been using the platform for high-sensitivity single-plex analysis of individual proteins like the Alzheimer's marker phosphorylated tau 217. In the past, [Luo has said](#) he expects Alamar to also compete with companies like Quanterix that specialize in lower-plex, high-sensitivity assays.

Luo said the company **plans** to provide the NULISA **platform** to a small group of early-access customers in the second half of the year in anticipation of the 2024 launch. The company, which has around 70 employees, is backed by an [\\$80 million Series B financing round](#) that it closed in 2021 and that brought its total funding to \$110 million.

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