# Roche Acquires AbVitro's Sample Prep Tech to Integrate with Genia and PacBio Systems

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***Premium***

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NEW YORK (GenomeWeb) – Roche said last week that it has exclusively acquired next-generation sequencing sample prep technology developed by AbVitro, a company focused on using the human immune system to identify new therapeutic targets.

AbVitro's sample prep technology will be incorporated into Roche's sequencing R&D pipeline to "support our strategy of providing a full next-generation sequencing workflow solution for clinical sequencing," Tom Albert, head of research for Roche's Diagnostics Sequencing Unit, told *In Sequence*.

Specifically, he said, the technology will be used to develop targeted gene panels to support Roche's Genia and Pacific Biosciences sequencing instruments. He declined to disclose specifics on the types of disease panels or a timeline.

Despite announcing last October plans to shut down its 454 Life Sciences sequencing business and phase out the 454 sequencers by mid-2016, in the last year Roche has struck a number of other sequencing deals in an attempt to regain a foothold in the market.

Last year, it struck an agreement worth up to $75 million with Pacific Biosciences to develop a clinical sequencing system and assays based on PacBio's single-molecule technology. Then, in June, Roche acquired Genia, a single-molecule nanopore sequencing startup, for up to $350 million, including $125 million up front and another $225 million in milestone payments. And in July, the company announced that it had invested up to $15 million into Seattle-based Stratos Genomics, a nanopore sequencing spinoff from the Stratos Group.

According to Albert, AbVitro's sample prep technology was especially desirable because of its ability to work directly from whole blood and other "crude biological samples," an important feature for clinical applications.

AbVitro's sample prep technology, dubbed PETE for primer extension target enrichment, has two

key aspects that make it different from other enrichment technologies, Francois Vigneault, president and CSO of AbVitro, told *IS*: the decoupling of PCR with an initial primer extension step and the reliance on linear amplification instead of logarithmic amplification.

Vigneault did not want to disclose too many details of the technology, but he said that the team decoupled PCR into separate steps: an initial primer extension step followed by "clever barcoding." Then, the gene-specific targets are linearly amplified.

In most other target enrichment technologies, "when you do PCR you get that exponential problem of having many primers together in many cycles, and it creates artifacts of primers interacting the wrong way," he said. By decoupling the PCR, the problem of mis-interacting primers is avoided, he said. Additionally, "you don't have exponential amplification, which tends to introduce a lot of bias." By contrast, linear amplification results in much more uniform target coverage.

Another bonus, Vigneault said, is that purified DNA is not required. The technology will work directly from biological samples such as blood. Normally, doing sample prep directly from whole blood is challenging because when the cells are lysed they release nuclease and other material that inhibit PCR or degrade the enzyme, he explained. But, the initial primer extension will still work even with all the extra material.

The ability to sequence directly from blood is a "key advantage for clinical sequencing applications," Albert said, and a major reason why Roche was interested in AbVitro.

"There are definite gaps in the target enrichment space and the complete sequencing workflow that we want to try and fill," he added.

For instance, Albert said, AbVitro's PETE technology has the potential to be more efficient. "If you have a sequencer that can sequence in minutes to hours, you need a sample prep that can also be efficient. If it takes you a few days to do sample prep and your sequencing is a couple hours, who cares? We've got to speed up all parts of the process and make them all more efficient," he said.

He said that it was too early to say what AbVitro's turnaround time would ultimately be, but noted that it is currently "on par with other amplification-like technologies."

So far, the AbVitro technology has only been tested with shorter-read sequencing technologies, Albert said, so the researchers may have to make some adjustments to optimize it for the longer reads of the PacBio instrument.

Aside from supporting the Genia and PacBio instruments, Albert said that the Roche team would assess PETE along with Stratos Genomics' nanopore technology. "Specifics on integration of each technology will be part of the project planning in R&D," he said.

For its part, AbVitro has developed other technology aside from PETE, including immune sequencing technology dubbed AbSeq that uses a proprietary single-molecule barcoding strategy and analytic tools. According to its website, the technology enables full-length antibody sequencing, simultaneous B-cell and T-cell sequencing, and isotope identification. In addition, it

has developed an NGS-compatible antigen display library system called AbTarget and single-cell droplet technology to identify the heavy and light chain transcript pairs from B-cell and T-cell receptors.

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