

Agilent Case Study: 2100 Bioanalyzer and 4200 TapeStation systems

How the Shanghai Biotechnology Corporation Advanced Their Sample QC Speed and Scalability

About Shanghai Biotechnology Corporation

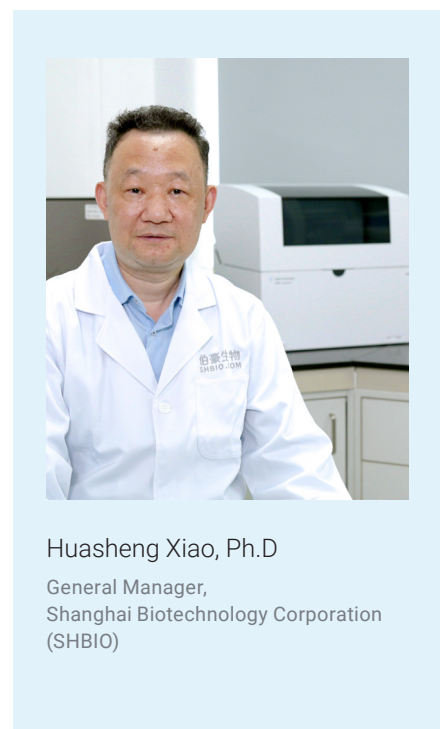
The Shanghai Biotechnology Corporation (SHBIO) specializes in reagent manufacturing and in vitro diagnostic (IVD) reagent research and development. A spin-off of the National Engineering Center for Biochips at Shanghai, SHBIO has integrated their original microarray platforms with high-throughput sequencing and other supporting technologies.

According to SHBIO General Manager Huasheng Xiao, Ph.D., SHBIO has a broad client base including biological, medical, and clinical researchers. Throughout the last 20 years, the SHBIO research team has processed samples from over 200 different species, including human biospecimens and those from model organisms. The sample types consist of fresh tissues, blood, body fluids, formalin-fixed, paraffin-embedded (FFPE) tissues, cultured cells, cell lines, microorganisms, and plants.

With that many different sample types, it is not unusual to encounter variation in sample quantity, which can present technical challenges. The research team receives microsamples with a highly limited volume, such as the case with blood samples for cell-free DNA (cfDNA) or cell-free RNA (cfRNA). An additional challenge is the qualitative variation of the samples received by the laboratory. "Some samples have more intact DNA or RNA, while some are more degraded. This poses a huge challenge to sample extraction, purification, and quality control," said Dr. Xiao. To meet the challenges posed by the diversity of sample quantity and quality, Dr. Xiao noted that different samples require unique and suitable processing methods.

Rigorous Sample Quality Control

Dr. Xiao and the research team at SHBIO have implemented stringent sample quality control (QC) methods into their laboratories to counter variations in sample quantity and quality. Sample quality is key to the robustness of the subsequent test data. For example, because SHBIO researchers perform a lot of next-generation sequencing (NGS), they assess sample quality and quantity at various stages during library preparation to help ensure high-quality sequencing results. "Library quantitation is directly associated with data quality, and inaccurate quantitation leads to changes in subsequent data quality," said Dr. Xiao.



Huasheng Xiao, Ph.D.
General Manager,
Shanghai Biotechnology Corporation
(SHBIO)

"Transitioning from the 2100 Bioanalyzer system to the 4200 TapeStation system has increased our throughput, speed, and our laboratory efficiency. This naturally allows overall cost control." – Dr. Xiao

SHBIO researchers implemented the Agilent 2100 Bioanalyzer system into their labs to evaluate RNA quality 20 years ago, making them some of the first users of the Bioanalyzer system in China. The RNA integrity number (RIN) provided by the Bioanalyzer system played an important role in their RNA sample QC, because the quality requirements for their chip projects were quite high. Using RIN, the team could determine which samples were suitable for downstream chip methods and which were not.

The SHBIO team also needed to assess the quality of their genomic DNA samples, a feature that was not available on the Bioanalyzer system. By implementing the Agilent 4200 TapeStation system into their laboratory workflow in 2020, they have been able to assess DNA quality using the DNA integrity number (DIN). This has facilitated their ability to perform quality analysis on DNA samples and ensure their specimens are of acceptable quality.

Benefits of Converting to the TapeStation System

The Bioanalyzer system was fit-for-purpose in the company's beginning. As SHBIO continued to grow, their projects and sample submissions significantly increased and became more complex. To meet that demand and realize a more comprehensive quality control process, the SHBIO team needed a scalable system with faster time-to-results, improved ease-of-use, and capacity to assay different sample types.

SHBIO added the 4200 TapeStation system to their sample QC workflow as soon as it was available in China. Capable of processing between one and 96 samples at a time, the 4200 TapeStation delivered increased flexibility in sample throughput and quality metric testing options. The TapeStation system has enabled the team to assess the quality of both RNA using RINe and DNA using DIN.

In addition to the increase in automation and sample throughput using the 4200 TapeStation system, the

laboratory staff likes how easy it is to use the instrument and Agilent ScreenTape assays. The sample loading is simple and quick, saving labor and time, and the independent lanes prevent cross-contamination.

Future Plans

By emphasizing sample quality, SHBIO has refined and perfected their gene chip technology and successfully implemented high-throughput NGS workflows. SHBIO continues to grow because of their excellent reputation for high quality and positive client working relationships. Dr. Xiao and SHBIO researchers have established and nurtured effective collaborations with many scientists to provide them with technical support and laboratory services.

Throughout their development journey, the SHBIO team has also partnered with Agilent for instrumentation, reagents, and technical services including microarrays, PCR, LCMS, and sample quality control testing. "On the whole, I think that the collaboration with Agilent over the past 20 years has been successful. Therefore, we hope that our future collaboration can be further expanded and deepened to provide genomics techniques and products to our clients," said Dr. Xiao.

An important, rising application at SHBIO is cell-free DNA (cfDNA). The team currently assesses a limited number of cfDNA samples, but client interest in this sample type is growing. Early screening studies are gaining attention and plasma samples submitted for cfDNA analysis are expected to increase. In the future, the team plans to use the 4200 TapeStation system and the Agilent Cell-free DNA ScreenTape assay to meet this anticipated increased demand.

Not only is the SHBIO team looking to expand their cfDNA testing, but they are also focusing on single-cell and spatial transcriptome sequencing. Whichever projects, technologies, products, and services SHBIO undertakes, the highest quality and care can be expected from this company, thanks to research leaders like Dr. Xiao.

Learn more about the Agilent 4200 TapeStation system at:

www.agilent.com/en/product/automated-electrophoresis/tapestation-systems

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