

Quantabio Joins Forces with BioLegend to Improve Sample Processing for Single-Cell RNA Expression and Proteomic Studies



Highly efficient and reliable sparQ reagents enable TotalSeq™ customers to process up to 12 times more samples for the same cost as alternative products

In recent years, we have seen great advances in next-generation sequencing (NGS) and droplet-based microfluidic technologies that have enabled scientists to analyze mRNA expression data from thousands of individual cells at the same time. In fact, high-throughput single-cell RNA sequencing (scRNA-seq) assays have transformed our understanding of cell-to-cell variability in complex cellular populations and the role it plays in human health and disease. However, until recently, scientists have not been able to easily combine transcriptomic and proteomic analysis in the same individual cell.

In 2018, BioLegend and the New York Genome Center (NYGC) entered into an exclusive worldwide license and collaborative research agreement to address this unmet market, covering the need for a novel, multimodal analysis method that combines the many advantages of traditional flow cytometry with single-cell RNA sequencing in one application. They worked together to commercialize a new set of reagents and integrative workflow that was originally developed by a team led by Dr. Peter Smibert in the NYGC's Technology Innovation Laboratory. The new technique called CITE-seq (Cellular Indexing of Transcriptomes and Epitopes by sequencing) uses DNA-barcoded antibodies to enable scientists to distinguish different cell types and cell states by simultaneously measuring both protein markers and mRNA expression at the single-cell level.

BioLegend is a leading developer and manufacturer of cutting-edge flow cytometry, cell biology, functional assays, and antibodies for research in immunology, cancer research, stem cells, neuroscience and more. The partnership with the NYGC expanded the reach of its reagent portfolio into the rapidly advancing space of genomic and transcriptomic pro-

filings. To facilitate standardization, the two organizations and 10x Genomics worked together to establish a reliable set of static oligonucleotide barcodes that are linked to specific antibody clones.

These ready-to-use antibody-oligonucleotides for CITE-seq are now provided by BioLegend as part of its TotalSeq™ product line that enables highly multiplexed proteomics and transcriptomics across a range of NGS applications. These products were designed to integrate seamlessly into existing single-cell RNA sequencing workflows, including Drop-Seq and those available from 10x Genomics.

Quantabio Advantages

To help improve the TotalSeq protocol, BioLegend began testing various PCR master mixes and SPRI bead alternative products for PCR amplification and clean up. The team required a reagent solution that generates reproducible results with a fast and easy workflow and cost-effective sample price. Scientists performing single-cell applications are often working with precious samples with limited cDNA – usually in the picogram range. After rounds of testing and evaluation, BioLegend determined Quantabio's sparQ HiFi PCR Master Mix and sparQ PureMag Beads were the most efficient reagents for this application and began including them as part of its recommended proteogenomics protocols.

Quantabio offers complete solutions for library preparation, amplification, purification and quantification. The high-quality reagents deliver unmatched efficiency and robust performance to ensure reliable and reproducible sequencing results while reducing total sequencing costs. The sparQ HiFi PCR



Master Mix is a high-fidelity, high-efficiency PCR master mix for NGS workflows requiring DNA library amplification prior to sequencing. The hot-start, proofreading DNA is specifically engineered to improve library amplification efficiency while reducing PCR-derived artifacts, resulting in higher library yields and better coverage uniformity. This kit supports low picogram range of DNA input and efficient amplification of AT- and GC-rich regions with minimal bias.

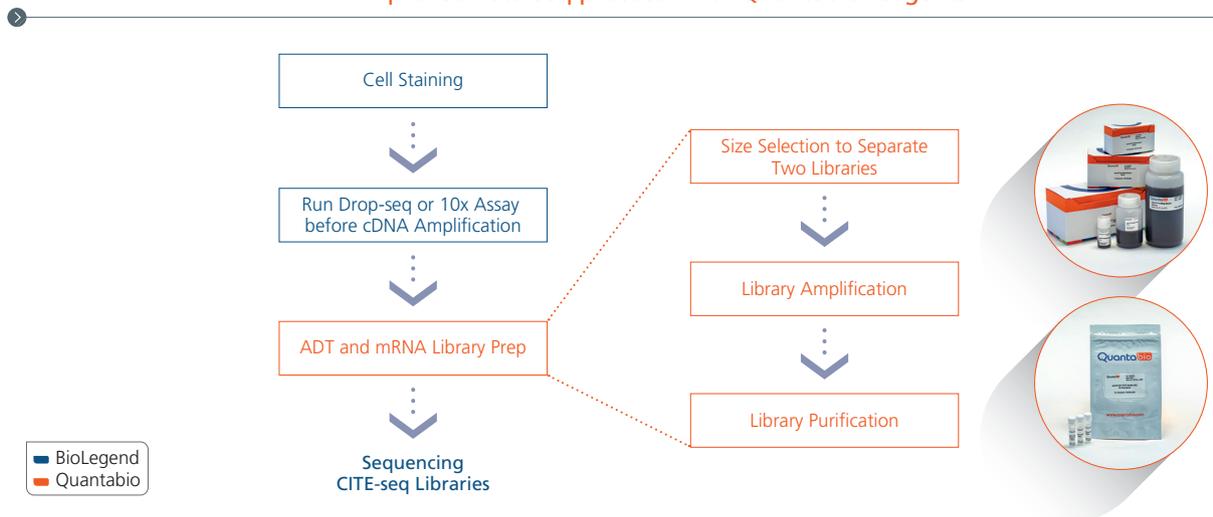
The sparQ PureMag Beads are a fast and reliable nucleic acid purification system for reaction cleanup and size selection in NGS workflows. The sparQ PureMag Beads can be used to quickly remove primers, primer-dimers, unincorporated nucleotides, salts, adapters, and adapter-dimers from NGS library prep reactions to improve downstream sequencing performance. They allow excellent recovery of fragments greater than 100 bp without centrifugation or filtration. Consistent and reliable size selection can be achieved by simply adjusting the beads to sample ratio. This product is designed for both manual and automated processing, allowing a seamless integration into existing workflows.

Results

Customers around the world are now working tirelessly to advance single-cell characterization with the TotalSeq and sparQ reagent solutions. Compared to the previous reagents, BioLegend is now able to process up to 12 times more samples for the same cost and the same high-efficiency, low-bias library amplification.

BioLegend customers at the Cancer Research Center of Toulouse in France used the TotalSeq and sparQ product combination to develop a free, open-source and user-friendly analytic tool for multimodal single cell datasets. This useful algorithm is particularly relevant for fully exploiting approaches that require multimodal analysis because plots can be defined without limiting the number of parameters, such as antibodies, genes, signature scores, or their combination used to define a plot. The authors also demonstrate the utility of their tool, called Single-Cell Virtual Cytometry, to analyze not just CITE-seq-like data, but different types of datasets, including chromatin accessibility, spatial transcriptomics and spatial proteomics, among others.

Improved TotalSeq protocol with Quantabio reagents



“BioLegend develops world-class, cutting-edge antibodies and reagents for biomedical research that are manufactured in a state-of-the-art facility in San Diego, CA. The company’s products are supported by superior customer service and a quality management system that is certified for ISO 13485:2016. Contact them today to learn more about how you can partner with BioLegend on your scientific discovery journey.”

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