Study Shows how CRISPR Labeling further expands BioNano Genomics' Next-Generation Mapping applications

Results published in Nucleic Acids Research

SAN DIEGO, CA – January 6, 2016 – BioNano Genomics, Inc., the leader in physical genome mapping, today announced results from a study demonstrating proof of concept methodologies for CRISPR DNA labeling in combination with next-generation mapping (NGM) using BioNano's NanoChannel array technology. This array technology is at the core of the Irys® System, an automated, high-throughput whole-genome mapping and structural variation analysis platform.

Results from the study, entitled "CRISPR-CAS9 D10A nickase target-specific fluorescent labeling of double strand DNA for whole genome mapping and structural variation analysis," were published online in the peer-reviewed journal *Nucleic Acids Research.*

Led by researchers at Drexel University in Philadelphia, the study combined NGM using BioNano's technology with a targeted labeling strategy involving the Cas9 D10A protein and the genome editing tool CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) to form a DNA complex able to target repetitive sequences and barcode genomic regions and structural variants. Importantly, this new labeling technique renders the labeled double-stranded DNA available in long, intact stretches for high-throughput analysis using NanoChannel arrays.

This research shows that the method of combining NGM and targeted CRISPR-CAS9 labeling has the potential to further broaden the Irys System's range of applications, including automated high-throughput genome-wide mapping and targeted analyses of complex regions containing repetitive and structurally variant DNA.

Han Cao, Ph.D., Chief Scientific Officer of BioNano Genomics, commented, "This publication opens up an exciting frontier in genomics research as it provides an example of how, with the combination of next-generation mapping and the CRISPR-CAS9 system, a relatively new technology, we enable Irys users to open up the capabilities of our core technology to further explore genomes to help reveal complex areas otherwise invisible by other technologies. Used together, those technologies can be used to specifically target certain loci for clinical testing, which could have applicable clinical diagnostic implications in the future. Furthermore, the study demonstrates the versatility and value of the Irys System to be utilized with different genome analysis and editing tools to enable the development of new applications. Moving forward, we expect that more Irys users will leverage the power of Irys's NanoChannel array technology to develop user-driven applications as the one presented in this publication."

References

McCaffrey, J. et al. "CRISPR-CAS9 D10A nickase target-specific fluorescent labeling of double strand DNA for whole genome mapping and structural variation analysis." *Nucleic Acid Research*, 2015. Available online at: http://nar.oxfordjournals.org/content/early/2015/10/19/nar.gkv878.full.pdf+html

About the Irys® System

The Irys® System can provide valuable insights about the biology of the genome based on information about the order, orientation, arrangement, and interaction of genomic components. Irys also works as a complement to read-based sequencing technologies to yield long-range genomic information, identify structural variations and bridge repeats and other complex elements in the genome. The Irys System uses IrysPrep® Reagents to extract and label long DNA molecules and the IrysView and IrysSolve® software to provide powerful *de novo* assemblies and analysis of the genome.

About BioNano Genomics

BioNano Genomics, Inc., the leader in next-generation mapping (NGM), provides customers with genome analysis tools that advance human, plant, and animal genomics and accelerate the development of clinical diagnostics. The Company's Irys® System uses NanoChannel arrays integrated within the IrysChip® to image genomes at the single-molecule level with average single-molecule lengths of about 350,000 base pairs, which leads the industry. The long-range genomic information obtained with the Irys System helps decipher large, complex DNA repeats, which are the primary cause of inaccurate and incomplete genome assembly.

On its own, next-generation mapping with the Irys System enables detection of structural variants, many of which have been shown to be associated with human disease as well as complex traits in plants and animals. As a companion to next-generation sequencing, next-generation mapping with the Irys System integrates with sequence assemblies to create contiguous hybrid scaffolds that reveal the highly-informative native structure of the chromosome.

Only BioNano Genomics provides long-range genomic information with the cost-efficiency and throughput to keep up with advances in next-generation sequencing.

The Irys System has been adopted by a growing number of leading institutions around the world, including: National Cancer Institute (NCI), National Institutes of Health (NIH), Wellcome Trust Sanger Institute, Broad Institute of MIT and Harvard, BGI, Garvan Institute, Salk Institute, and McDonnell Genome Institute of Washington University. Investors in the Company include Battelle Ventures, Domain Associates, Legend Capital, Novartis Venture Fund, Federated Kaufmann, Monashee Investment Management, and Gund Investment Corporation.

For more information, please visit us at www.BioNanoGenomics.com.

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