BioNano's Irys System Adopted by Leading Genomics Centers for Comprehensive Detection of Human Genome Structural Variation

SAN DIEGO— Oct. 21, 2014—BioNano Genomics, the genome mapping company, announced today the latest genomics research centers to purchase an **Irys™ System.** Among them are the **Salk Institute**, the **National Cancer Institute** (NCI), **NIH Intramural Sequencing Center** (**NISC**) and **Genoscope** (The French National Sequencing Center). Before Irys, obtaining a comprehensive view of a genome was a major hurdle, because next generation sequencing (NGS) does not deliver the scalability or reliability to detect and assemble large repetitive elements and structural variations. To achieve high quality genome analysis and comprehensive views of variation, a complete genome map is essential.

BioNano's Irys System is a long-read genome mapping solution that reveals the location, order and orientation of clinically relevant genome components, including the length and location of long repeats and viral integration sites, which are often implicated in complex diseases such as cancer. Irys finds all types of structural variations in a single run, without prior knowledge of the variants.

The Salk Institute plans to implement the Irys System to develop more complete and accurate assemblies to better understand the contribution of structural variation for human and plant genomes. Structural variation comprises the majority of differences among individuals within any species. Next generation sequencing can quickly identify what pieces are in the puzzle, but an accurate map or picture is needed to fully assemble each individual genome.

Structural variation, which comprises a substantial portion of genome differences among individuals, has been connected to numerous diseases and is expected to be crucial to applying genomic information in personalized medicine and diagnostics. Structural variations include insertions, deletions, inversions, translocations and repeats. As a whole, they have sometimes been referred to as the "inaccessible genome," because next generation sequencing (NGS) technologies in large part miss this vital information.

"The adoption by these four prestigious centers is telling of researchers' response to the capabilities of BioNano's Irys System as a 'must-have' technology," said Todd Dickinson, Ph.D., vice president, Global Commercial Operations at BioNano Genomics. "BioNano's Irys System streamlines the process of genome assembly, annotation, and structural variation analysis, and provides a single platform to perform large, comprehensive structural variation studies. Irys provides rapid and reliable access to this previously 'inaccessible genome.'"

NCI will be using the Irys System to analyze the role of structural variation in the development and progression of cancer. At **NISC,** the Irys System will be available as a core technology to run human and non-human samples, including microbial, invertebrates and pathogens. Founded in 1996, **Genoscope**, which was involved in the sequencing of the human genome, has adopted the Irys System to detect structural variation and to complete genomes for various projects.

"Large-scale structural variation in particular has been implicated in a broad range of cancers and is essential to furthering our understanding of this disease," said Dr. Dickinson. "Without technologies that

can identify and organize all the structural variation within a cancer genome, the complexity of mutations and rearrangements cannot be untangled."

Dr. Dickinson concluded, "Enabling the cancer research community with the Irys system for translational research is a key part of our strategic mission and commercialization strategy. We are thrilled that the National Cancer Institute has adopted BioNano's Irys System to provide a comprehensive picture of structural variation and enable a systematic understanding of the genetic drivers of cancer."

About Irys

Irys makes it possible to routinely and accurately detect genomic structural variation and to finish genome assemblies. The fully automated Irys benchtop instrument uses the IrysChip to uncoil and confine long DNA molecules in proprietary Nanochannel Arrays™ where they are uniformly linearized in a highly parallel display for high-resolution, single-molecule imaging. Irys does not employ DNA fragmentation or amplification, which are typical with next-generation sequencing. The result is sequence information over extremely long "reads" ranging from hundreds of kilobases to a megabase, where the sample's valuable structural information is preserved. Irys makes it possible for researchers to directly observe structural variants including replications, deletions, translocations and inversions.

About BioNano Genomics

Headquartered in San Diego, BioNano Genomics is delivering an altogether better way of gaining a fully informed understanding of genomes. The Company's platform provides researchers and clinicians the most comprehensive, organized and actionable picture of a genome with unprecedented insights into how the individual components of genomes are ordered, arranged, and interact with each other. BioNano Genomics works with institutions in life science, translational research, molecular diagnostics and personalized medicine. The Company is supported by private investors and grant funding from genomics programs at federal agencies, including the NIH and NIST-ATP.

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