China’s Direct Genomics introduces the first single molecule genome sequencer for the clinic

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Shenzhen, China (PRWEB) October 27, 2015 -- Direct Genomics today announced the GenoCare™ Analyzer, the world’s first single molecule genome sequencer that is being engineered exclusively for the clinic. The GenoCare system improves the cost, speed, and quality of clinical genome sequencing by directly reading a patient’s original DNA or RNA molecules.

In contrast to the genome sequencing instruments entering clinical use today, Direct Genomics’ GenoCare Analyzer does not require any of the prerequisite steps, such as amplifying (i.e., copying) a patient’s DNA thousands of times, that currently drive up costs and generate potential artifacts in patients’ genetic material.

“We have been working with eminent physicians and scientists in China and around the world to build a novel technology that can make genomics an affordable part of everyday patient care,” says He Jiankui, Ph.D., founder and CEO of Direct Genomics and an Associate Professor at South University of Science and Technology of China.

Direct Genomics’ scientific advisory board includes Stephen Quake, Ph.D., Professor of Bioengineering and Applied Physics at Stanford University; Michael Deem, Ph.D., Professor and Chair of the Department of Bioengineering at Rice University; and J. William Efcavitch, Ph.D., who has led research and development for numerous genomics instruments at Affymetrix, Applied Biosystems, and Helicos BioSciences.

Dr. He announced the GenoCare system today at the Advances in Genome Sequencing Technology conference in Shenzhen, China. Simultaneously, the first data from a prototype GenoCare instrument, was released on bioRxiv.org in a preprint publication, which highlights the sequencing methodology and data quality metrics from the sequencing of clinically relevant mutations in several oncogenes. Accuracy for sequencing EGFR, KRAS, and BRAF genes was found to be 95% on average at 1X coverage and approaching 100% at 5X coverage.

The first three hospitals involved in the GenoCare Early Access Program, which will be open to more organizations in 2016, are Shenzhen Women’s and Children’s Health Hospital, Shenzhen People’s Hospital, and Southern Medical University in Guangzhou, China. Clinicians at these three hospitals are evaluating viral DNA or circulating tumor DNA found in patients’ blood to inform the personalized selection of Hepatitis B antiviral medications or cancer therapeutics.

“Drug resistant Hepatitis B is becoming a huge problem for millions of people infected with the virus in China, which has one-third of the world’s infected population. An affordable system to sequence the viral genome for the basis of drug resistance would allow clinicians to put patients on the right therapeutic choice right away. The GenoCare single molecule genome sequencer could push everyday Chinese medicine to be a cutting-edge, worldwide standard,” says Dr. Wang Zhanhui, Professor of Infectious Diseases at Southern Medical University.
Direct Genomics’ GenoCare analyzer reads a patient’s original DNA molecules by a sequencing-by-synthesis methodology called single molecule targeted sequencing (SMTS). Single molecule sensitivity is achieved through total internal reflectance fluorescence (TIRF) microscopy, in which a precisely angled laser generates a fast-decaying, evanescent wave. This wave concentrates illumination to a patient’s DNA molecules, preventing illumination of unwanted contaminants that would otherwise obscure the faint signal from a single strand of DNA. SMTS also minimizes costs by sequencing solely the regions of a patient’s genome of clinical relevance, such as selected cancer genes known to influence resistance or susceptibility to therapeutics. The GenoCare™ sample preparation protocol requires only a single step, fragmenting the DNA, which further minimizes costs, labor, and the time to result. In the case of FFPE material, sonication may not even be needed.

“The single molecule approach provides a level of confidence appropriate for the clinic. It also presents technical advantages, such as reducing the risk of sample handling errors and allowing the absolute quantitation of gene expression or copy number variations that are important in numerous diseases,” says He.

Earlier this year, Direct Genomics secured worldwide freedom to operate by licensing key single molecule sequencing patents from the California Institute of Technology.

About Direct Genomics
Together with clinicians, Direct Genomics is making genomics an affordable part of everyday patient care. The company’s GenoCare™ instrument is the first single molecule sequencer built exclusively for the clinic. The technology simplifies genome sequencing by reading the individual and original DNA and RNA molecules directly from a patient’s blood or tissue samples, delivering significant improvements in cost and speed. Established in 2012, Direct Genomics is headquartered in Shenzhen, China and is backed by top institutional and private investors.
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