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Ã¢â?¬Å?Creation of reference genomes will set up baseline on larger scale of genetic researchÃ¢â?¬Â•

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Indonesia has established its first national integrated biomedical programme, the Ã¢â?¬Ë?Biomedical and Genome Science Initiative (BGSi)' in Jakarta designed to foster precision medicine in the country by integrating the potential of genomics into healthcare services. The government of Indonesia is committed to developing population genetic databases as part of its biomedical innovation and public health initiatives. Supporting the initiative, a leading bioscience technology provider in Shenzhen (China), the MGI Tech Co. Ltd. (MGI), is on its mission to leverage cutting edge sequencing techniques to assist Indonesia's extensive venture to combat health concerns via developing more effective therapeutics in the country. The BGSi genome and biomedical research initiative will have a profound impact on Indonesia for the next five years. In an interaction with BioSpectrum Asia, Dr Roy Tan, General Manager of MGI Asia Pacific elaborated on the cutting-edge automation and sequencing technology shaping Indonesia's National Genome Project. Edited excerpts;



Which are the project initiatives that MGI will support as technology providers for Indonesia's National Genome Project?

Budi Gunadi Sadikin, Minister of Health, (Kemenkes), government of Indonesia officially launched the BGSi on August 14, 2022. BGSi is the first national initiative programme created by the Ministry of Health to develop more appropriate treatment for the community. The method used relies on the technology of collecting genetic information (genome) from humans and pathogens such as viruses and bacteria or commonly referred to as whole genome sequencing (WGS).

Regarded as a scientific breakthrough and the first of its kind in Indonesia, the project targets to collect biological samples and curate the unique genome data of 10,000 Indonesians in the next two years to develop insights into and map variants from the local population with pre-determined priority diseases. The results will contribute to the research and development of treatment in six main disease categories: cancer, infectious diseases, brain and neurodegenerative diseases, metabolic diseases, genetic disorders, and aging.

In conjunction with BGSi, what are the implications of this national initiative? How will MGI contribute to creating a credible and accountable population database?

MGI is honoured to have this opportunity to support Indonesia's National Genome Project by providing our cutting-edge automation and sequencing technology to improve human health.

Based on its proprietary technology and the market trend of genetic sequencers, MGI has developed a full range of genetic sequencers from small to medium-throughput benchtop genetic sequencers, to high-and-ultra-high-throughput genetic sequencers in order to accommodate different sequencing needs. MGI's DNBSEQ-T7RS can produce up to 1~6 TB of high-quality data per day and is well suited for national genome projects as well as whole genome sequencing, deep exome sequencing, epigenome sequencing, transcriptome sequencing, and tumour panel. It supports multi-sequencing modes with increased accuracy, reduced duplicates, and reduced index hopping, making it a competitive platform for scientific research, clinical research, and disease prevention.

MGI's automation systems, MGISP-NE384 high-throughput automated nucleic acid extractor and MGISP-960 high-throughput automated sample preparation system will greatly automate labour-intensive and time-consuming procedures such as DNA/RNA extraction and library prep for high throughput sequencing, thus contributing to improving the overall efficiency and productivity in NGS laboratories.

MGI will provide its ultra-high-throughput genetic sequencer, automation systems and data processing platform to help this programme creating a total workflow and solution and making a more effective lab, with the help of its strategic local partner PT Bakti Energi Abadi.

Are there any collaborative efforts involved in the project?

MGI, with the help of its strategic local partner PT Bakti Energi Abadi, will create a total workflow based on ultra-high-throughput genetic sequencer DNBSEQ-T7RS, the MGISP-960RS and MGISP-NE384RS automation systems, and ZTRON data platform to support the BGSi initiative.

Budi Gunadi Sadikin, Minister of Health, Indonesia, explained that the Ministry of Health will expand the sequencing capacity which will be supported by the Global Fund. Until December 2022 there will be 56 genome sequencing machines spread across 43 laboratories in Indonesia.

How is MGI planning to strengthen Indonesia's biomedical sector and its global competitiveness in life science innovation?

With the implementation of precision medicine through the use of genetic technology, MGI, with the help of its strategic local partner PT Bakti Energi Abadi, will help this programme create a total workflow based on its ultra-high-throughput genetic sequencer, automation systems, and data processing platform. With the large-scale of genomic data collected during the 10,000 whole genome sequencing, bioinformatics talents are needed to analyse these data. The creation of the reference genomes for Indonesia will set up a baseline on the larger scale of genetic research. Comprehensive training from MGI will help to cultivate talents needed for Genomics science and biomedical research. The collaborations among the local researchers and aboard experts, education, and training programmes help Indonesian researchers to improve their genomic science and research programmes that will strengthen their biotech capabilities. Like China or other countries, as the local genomics talents developed, not imported, a new industry with many startups combined with vast local biodiversity will come and spur.

How does MGI build therapeutics and disease prevention strategies in Asia Pacific while optimising the efficiency of NGS laboratories?

With a strong focus on the upstream of the sequencing industry, MGI is mission-oriented to develop more advanced life science tools to empower downstream customers in reproductive health, precision cancer diagnosis and treatment, infectious diseases, food security, agriculture, forestry, fishing, consumer genomics, etc. MGI's automation systems improve sample extraction, processing and sequencing procedures to dissect the genetic disparities for understanding the disease genesis and profilaxis.

The introduction of MGI sequencing and automation systems aligns with Indonesia's national strategy - Biomedical and Genomics Science Initiatives for Precision Medicine. It is the key to understand the genetic information such as mutation and diversity to have an earlier screening or monitoring programme based on ctDNA/RNA circulating tumor genetic materials in one's blood, to detect or diagnose earlier and treat earlier for cancer prevention, to stratify the different diseases and design the individualised treatment for personalised medicine. All diseases related to cancer are due to changes of genetics in our aging process. Understanding the genetic variations will aid in better control over precision medicine and technology.

In addition to collaborating with Nalagenetics, MGI has, lately, partnered with MiRXES, a Singapore-headquartered biotechnology company, to accelerate spatio-temporal transcriptomics and multi-omics research in human development and diseases. Based on MGI's leading DNBSEQ-T10×4RS sequencing system, MiRXES aims to build an ultra-high-throughput, high-resolution spatial genomics pipeline in Singapore to give local researchers access to cutting-edge capabilities to generate novel biological insights into complex diseases such as cancer and allow for discovery of new biomarkers and pathways for targeted drug development.

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