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**28 SEPTEMBER 2016**

## GIS AND VIVO BIOSCIENCES PARTNER TO ADVANCE 3D CELL CULTURE SYSTEMS FOR PRECISION ONCOLOGY

**SINGAPORE** – A*STAR's Genome Institute of Singapore (GIS) has partnered Vivo Biosciences Inc. (VBI) – an Alabama-based biotechnology company focused on providing unique 3D culture reagents – in a joint research effort to advance precision oncology. This collaboration supports advanced systems for culturing human cells, which provide the most effective conditions for replicating complex biological functions in *in vitro* systems. With the GIS' high-throughput functional genomics infrastructure, the team will be able to produce unique cellular, organoid, and tumour microspheroid models that can be used for investigating disease pathology and screening drugs to identify novel therapeutics.

This project focuses on three-dimensional (3D) tissue models that can capture cell-cell and cell-matrix interactions. Compared to the traditional two-dimensional (2D) culture of cell monolayers, 3D models mimic native tissues more closely since the cellular microenvironment established in the 3D models often plays a significant role in disease progression and cellular responses to functional genomics.

Most cells within the human body interact with neighbouring cells and extracellular matrix components to establish a unique 3D organisation. These cell-cell and cell-matrix interactions form a complex communication network of biochemical and mechanical signals, which are critical for normal cell physiology, and their response to the stromal and immune microenvironment.

### Collaboration Aims

Through this collaboration, the aim is to create a robust and comprehensive panel of 3D cell culture models from direct patient-derived primary cells for the characterisation of different disease phenotypes, and investigate chemo-response to novel or known drugs, as well as identify genetic vulnerabilities.

Another key objective is to create biologically relevant 3D models to identify and characterise compound interactions to find "molecular partners" by using synthetic lethal screens.

In addition, this collaboration will explore the biology of stem cells and induced pluripotent stem cells (iPSCs) by 3D cell culture models, and use chemical/genetic screens to identify novel directed differentiation protocols for disease modelling; and finally, develop next-generation preclinical 3D tissue models for predictive toxicology screening.

Overall, this project will target the two key areas of drug discovery and stem cell reprogramming.

The use of animal models in drug discovery studies presents issues with feasibility and ethical concerns. To address these limitations, *in vitro* tissue models have been developed to provide a means for systematic, repetitive, and quantitative investigation of drugs. By eliminating or reducing the need for animal subjects, these models can serve as platforms for more tightly controlled, high-throughput screening of drugs and for pharmacokinetic and pharmacodynamics (PK-PD) analyses of drugs.

In terms of stem cell reprogramming, the small molecule approaches for the production of and direct cell reprogramming of iPSCs towards different cell lineage. The directed differentiation of iPSCs to create 3D *in vitro* models has the potential to provide the large numbers of cells and the many different cell types needed for the development of highly reproducible models for different testing purposes towards investigative biology.

VBI President & CEO Dr Raj Singh stated, "We are delighted about this first international collaboration involving our innovative technology platform, 3D HuBiogel culture, for functional genomics and oncology research programmes at GIS. This joint effort is expected to accelerate preclinical drug discovery and patient-based therapy analysis."

GIS Executive Director Prof Ng Huck Hui said, "I am pleased that GIS has gained a valuable collaborator in Vivo Biosciences. Our combined expertise and technology will allow for more accurate results in drug discovery studies as we work towards developing better targeted therapeutics for patients."

**IMAGE**
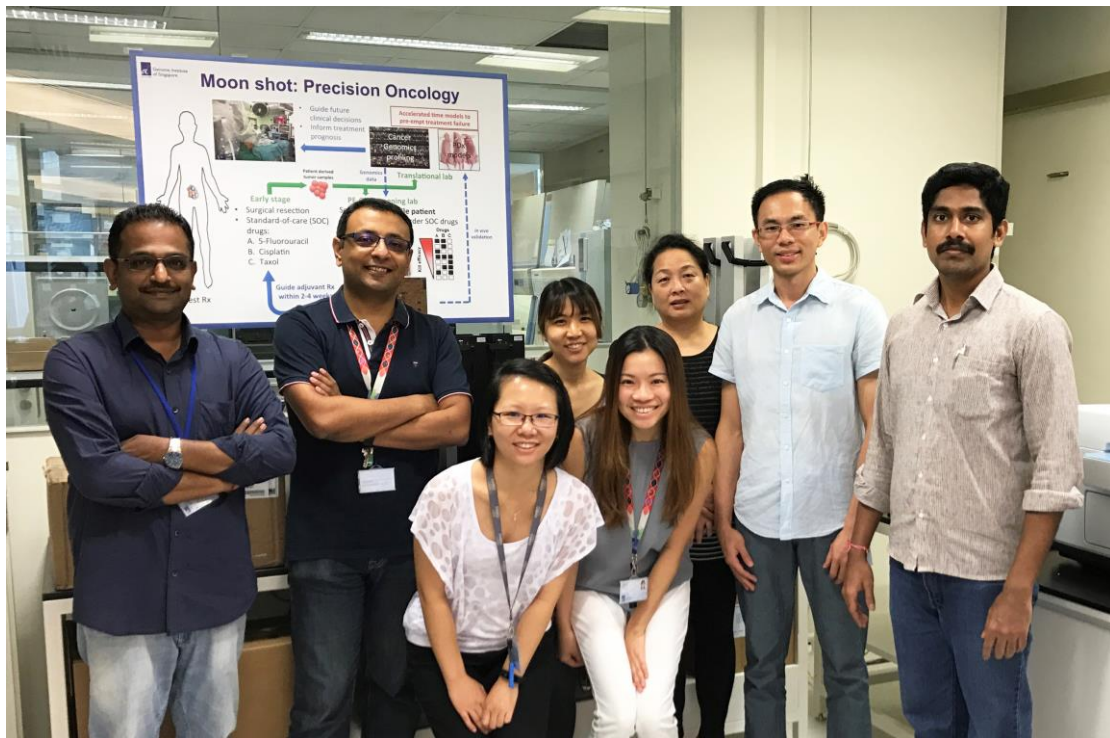


*GIS Precision Oncology team led by (2nd from left) Dr Ramanuj DasGupta, Group Leader*
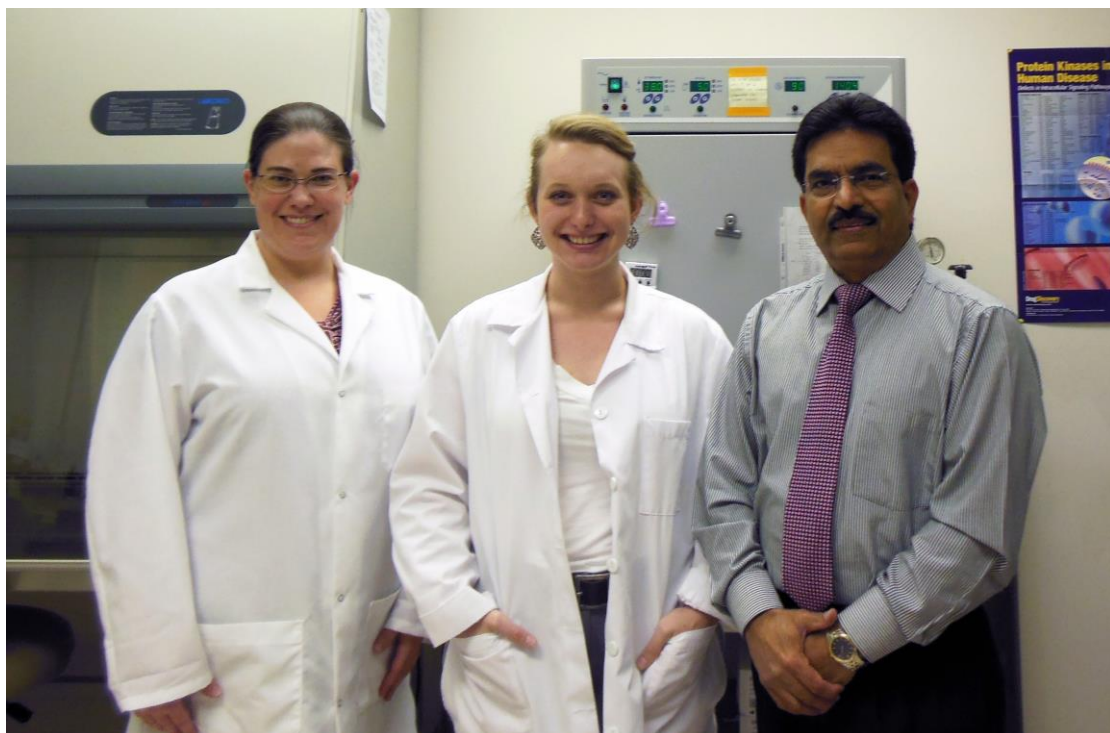


*(L-R) Vivo Biosciences R&D team Rachael Shevin, Lab Manager and Ashley Gilbert, Research Associate with Dr Raj Singh, CEO*

Note to Editors: please email our media contacts for high-resolution photos for publication.

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**About A*STAR's Genome Institute of Singapore (GIS)**

The Genome Institute of Singapore (GIS) is an institute of the Agency for Science, Technology and Research (A*STAR). It has a global vision that seeks to use genomic sciences to achieve extraordinary improvements in human health and public prosperity. Established in 2000 as a centre for genomic discovery, the GIS will pursue the integration of technology, genetics and biology towards academic, economic and societal impact.

The key research areas at the GIS include Human Genetics, Infectious Diseases, Cancer Therapeutics and Stratified Oncology, Stem Cell and Regenerative Biology, Cancer Stem Cell Biology, Computational and Systems Biology, and Translational Research.

The genomics infrastructure at the GIS is utilised to train new scientific talent, to function as a bridge for academic and industrial research, and to explore scientific questions of high impact.

For more information about GIS, please visit www.gis.a-star.edu.sg

**About the Agency for Science, Technology and Research (A*STAR)**

The Agency for Science, Technology and Research (A*STAR) is Singapore's lead public sector agency that spearheads economic oriented research to advance scientific discovery and develop innovative technology. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit society.

As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by contributing to societal benefits such as improving outcomes in healthcare, urban living, and sustainability.

We play a key role in nurturing and developing a diversity of talent and leaders in our Agency and Research Institutes, the wider research community and industry. A*STAR oversees 18 biomedical sciences and physical sciences and engineering research entities primarily located in Biopolis and Fusionopolis.

For more information on A*STAR, please visit www.a-star.edu.sg


**About Vivo Biosciences, Inc (VBI, USA)**

VBI is an emerging venture-backed biotech company developing novel 3-D or Tissue-like biology models for accelerating drug development, translational and biomedical research. The promise of its patented HuBiogel™ technology is driven by unmet need and physiologic rationale that in vitro biologic testing should replicate in vivo conditions.

VBI's R&D programs are supported by NIH and NASA research grants/contracts. Its 3D HuBiogel system is recognized for Top-10 Innovation 2012 award by *The Scientist*. VBI offers its unique 3D culture platform to many academic, government and pharma research institutions via mutual collaboration or partnership agreement.

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