

National Cancer Centre Singapore, Singapore General Hospital and Clearbridge BioMedics examine the heterogeneity of CTCs in breast cancer patients

15 April 2016, New Orleans – The National Cancer Centre Singapore, Singapore General Hospital (Department of Pathology), and Clearbridge BioMedics have collaborated on a research project that examines circulating tumour cells from local breast cancer patients. Preliminary data from the study revealed heterogeneity in the circulating tumour cells (CTCs) isolated from each patient’s blood samples and tumour biopsy or surgical specimens. Heterogeneity refers to the diversity or the differences between different tumours, and in this case, the differences among the different circulating tumour cells at the individual cell level. These results will be presented next week at the American Association for Cancer Research (AACR) Annual Meeting held in New Orleans, USA.

Breast cancers with increased levels of human epidermal growth factor receptor 2¹ (HER2) protein driven by the HER2 gene tend to grow and spread more aggressively than other breast cancers. However, the availability of anti-HER2 therapies such as trastuzumab has improved treatment outcomes significantly. Patients are normally selected for anti-HER2 targeted therapy according to the tumour HER2 levels based on a protein expression test called immunohistochemistry, or on a gene test called FISH (fluorescence in situ hybridisation) that measures the number of copies of the HER2 gene. Tumours which demonstrate HER2 protein overexpression or HER2 gene amplification benefit from HER2-targeted therapies.

In this study, researchers examined HER2 heterogeneity in CTCs obtained from the blood of 26 breast cancer patients. CTCs were successfully identified and recovered from blood samples of patients with both HER2-positive and HER2-negative breast cancers using the label-free ClearCell® FX1 System. The CTCs from these samples were found to exhibit certain molecular characteristics, such as chromosome 17 polysomy, whereby there are increased numbers of chromosome 17 carrying HER2 and other genes.

“This study demonstrated that CTCs capture the molecular heterogeneity of breast cancer at the cellular level. Some of the CTCs from patients with HER2-negative tumours were found to be HER2-positive with increased copy numbers of the HER2

¹ A growth-promoting protein

gene, while some of the CTCs from patients with HER2-positive tumours did not have increased numbers of HER2 gene. The presence of HER2-positive CTCs in patients, along with tissue biopsies which are commonly used to determine if a patient is HER2-positive, can potentially help determine the appropriate treatment regime. By leveraging upon our proprietary ClearCell® FX1 System, which is a label-free automated system to isolate intact and viable CTCs, Clearbridge BioMedics is happy to support such cutting edge research that aims to provide new insights leading to improved cancer management,” said Mr Johnson Chen, Managing Director and Founder Clearbridge BioMedics.

“Effective treatment begins with the right diagnosis. This is why we are relentless in our pursuit to provide an accurate, specific, and comprehensive diagnosis for our patients. Like Pathology, our collaboration at the CTC Centre of Research Excellence (CTC CoRE), bridges science with clinical medicine. By studying the heterogeneity of a patient’s cancer cells, personalising cancer treatment can be achieved. This will enable us to explore new methods to improve patient care and outcomes,” said Professor Tan Puay Hoon, Head, Department of Pathology, Senior Consultant, Singapore General Hospital.

“Circulating tumour cells can be regarded as a form of liquid biopsy, which is non-invasive and potentially useful for our patients. To advance the development of this technology platform, further research on its applications and utility will be conducted before using it for routine clinical care,” said Dr Yap Yoon Sim, Senior Consultant, National Cancer Centre Singapore and lead investigator in the study.

For more information on the study results, refer to:

Meeting:	American Association for Cancer Research (AACR) 2016
Session Title:	Predictive and Prognostic Biomarkers
Session Category:	Clinical Research
Abstract number:	5008
Location:	Section 27
Poster Board number:	2

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About Clearbridge BioMedics

Clearbridge BioMedics is a clinical stage oncology research and diagnostics company that enables real-time liquid biopsy using a label-free Circulating Tumor Cell (CTC) enrichment platform. It is a National University of Singapore (NUS) spin-off company that is committed to revolutionizing cancer diagnostics and patient care. The ClearCell® FX1 System, using the CTChip®, is based on novel microfluidics technology that effectively isolates intact and viable CTCs from patients’ blood. The system uses inertial focusing microfluidics for label-free CTC enrichment, capturing heterogeneous and dynamic cancer cells that could be used for cancer screening, diagnosis, staging, personalized medicine and treatment monitoring. Utilizing the next generation non-invasive liquid biopsy to analyze blood samples for CTCs, the device allows for real time analysis of disease before, during, and after treatment, which has become increasingly critical in the new era of precision medicine.

Headquartered in Singapore, Clearbridge BioMedics currently has customers spanning Asia, Europe and North America. The company has won numerous awards and garnered global recognition for the ClearCell® FX1 System. Clearbridge BioMedics has attained ISO 13485 certification in 2011.

Company website: www.clearbridgebiomedics.com. Introductory video: <http://youtu.be/aRBuOxLfX3g>

About NCCS

National Cancer Centre Singapore (NCCS) provides a holistic and multidisciplinary approach to cancer treatment and patient care. We treat almost 70 per cent of the public sector oncology cases, and they are benefiting from the sub-specialisation of our clinical oncologists. NCCS is also accredited by the US-based Joint Commission International for its quality patient care and safety.

To deliver among the best in cancer treatment and care, our clinicians work closely with our scientists who conduct robust cutting-edge clinical and translational research programmes which have been internationally recognised. NCCS strives to be a global leading cancer centre, and shares its expertise and knowledge by offering training to local and overseas medical professionals. www.nccs.com.sg

About SGH

Singapore General Hospital, a member of Singapore Health Services, is the public sector's flagship hospital. Established in 1821, SGH is Singapore's largest acute tertiary hospital with 1,700 beds and national referral centre offering a comprehensive range of 36 clinical specialties on its campus. Every year, about 1 million Singaporeans benefit from advanced medical care delivered by its 800 specialists. As an academic healthcare institution and the bedrock of medical education, SGH plays a key role in nurturing doctors, nurses and allied health professionals, and is committed to innovative translational and clinical research in her continual strive to provide the best care and outcomes to her patients. www.sgh.com.sg

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