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EMBARGOED UNTIL 11 NOVEMBER 2015, 1100H SST

11 NOVEMBER 2015

A*STAR AND NUS LAUNCH JOINT IMAGING CENTRE TO FURTHER TRANSLATIONAL CLINICAL RESEARCH

National platform for research imaging to study the impact of new therapies in key disease areas relevant to Singapore and the region

Singapore – Singapore's newest national platform for research imaging, the Clinical Imaging Research Centre (CIRC), was officially opened today, paving the way for further studies on the impact of new therapies in key disease areas such as tuberculosis, dementia and diabetes. The Centre will consolidate powerful clinical imaging research capabilities and resources into a comprehensive national platform, to catalyse world-class translational and clinical research and benefit patients. The Centre, a joint venture between the Agency for Science, Technology and Research (A*STAR), and the National University of Singapore (NUS) was opened by Guest-of-Honour, Minister for Finance and Deputy Chairman, National Research Foundation, Mr Heng Swee Keat.

Building the foundation for imaging capabilities for diseases in Singapore

Imaging modalities have long been important in the diagnosis of diseases, allowing clinicians to define and locate pathologies accurately. At the same time, bio-imaging helps clinicians to identify underlying molecular causes and study disease pathways, paving the way for the development of new drugs and therapies.

CIRC was created as the result of a joint venture agreement signed between A*STAR and NUS on 6 March 2008, to provide a shared national resource in human imaging for translational research by fostering collaboration between

scientists and clinicians. It is the first in Southeast Asia to use the MR/PET, a highly advanced medical imaging solution combining two powerful imaging techniques to better study disease pathways. With its cyclotron and radiochemistry facilities, CIRC is also the only national clinical imaging research centre in Singapore that will be able to produce and administer PET radiopharmaceuticals¹ to human subjects. CIRC intends to be able to perform first-in-man studies in future and to participate in early stage assessment of new drugs.

Focusing on diseases relevant to Singapore and Asia

These sophisticated technologies, coupled with the strong expertise of CIRC researchers, have empowered various investigators in Singapore to undertake in-depth clinical research. CIRC now hosts over 50 clinical research projects with investigators from 13 different institutions² throughout Singapore and industry. These projects focus on diseases that are pertinent for Singapore and Asia, so as to better address regional medical needs.

One such example is CIRC's collaboration with the NUS tuberculosis (TB) research programme (SPRINT-TB) on several projects for the discovery and development of TB imaging biomarkers, so as to more efficiently identify, monitor and treat the disease. CIRC's novel MR/PET scanner has enabled researchers to conduct more precise examination on TB lesions in the lungs and develop innovative treatment options. For example using CIRC's PET/CT and novel MR/PET scanners, investigators are exploring how to intercept TB infection early before any conventional clinical signs manifest, minimising its spread and threat to public health. According to the latest World Health Organization Global TB Report, TB is now a top infectious disease killer, having caused 1.5 million deaths worldwide in 2014. Of the estimated 9.6 million people who developed TB in 2014, 58 per cent were in Asia, primarily in the countries surrounding Singapore³.

¹ A PET radiopharmaceutical is a compound labelled with a positron-emitting nuclide that is administered in minute, non-pharmacological quantities to follow physiological or metabolic processes in the human body. The detection of the radiation emitted from the decay of the PET nuclide allows the compound to be followed even as it is being metabolised by the body.

² The 13 institutions include: A*STAR, NUS, the National University Hospital (NUH), the National University Heart Centre, Singapore, the National University Cancer Institute, Singapore, the Singapore Clinical Research Institute (SCRI), Singapore General Hospital (SGH), Nanyang Technological University (NTU), DSO National Laboratories, Gyeongsang National University Hospital in South Korea, Massey University in New Zealand, John Hopkins University and the French Institute for Research in Computer Science and Applied Mathematics (INRIA).

³ <http://www.who.int/mediacentre/factsheets/fs104/en/>

Another common illness which is of growing concern in light of the rapidly ageing population in Singapore is dementia. 10% of people aged 60 and above in Singapore have dementia⁴. Using a wide range of imaging methods including structural, functional and metabolic imaging, CIRC investigators are able to study how factors such as brain morphology, white matter structure, functional connectivity, cerebral perfusion and specific metabolites play a role in causing this illness and the progression of this disease. One such study which looked at the prevalence and risk factors of acute "silent" strokes and how such strokes are linked to cognitive impairment and dementia, suggested that controlling vascular risk factors such as diabetes and hypertension may be critical in minimising the development and progression of cognitive impairment and dementia.

Fostering strong ties with international partners and training talent

Given the regional and global relevance of CIRC's research areas, the centre has established key partnerships with renowned international institutions, such as Johns Hopkins University (JHU) and Lawrence Berkeley National Laboratory (LBNL) in the United States, University College London (UCL) in the United Kingdom, and Massey University in New Zealand. Together with these international collaborators, CIRC has embarked on neuroscience, cardiology and cancer research.

CIRC has also been instrumental in attracting international industry players to work with local investigators. These include companies such as TauRx, Eli Lilly and Kao Corporation amongst others. In addition, Siemens Healthcare is collaborating with the centre on studies that focus on low-dose imaging for lung screening, prostate cancer and PET imaging of radiolabelled antibodies.

Locally, CIRC is active in educating and training clinicians and health professionals across Singapore. To meet Asia's needs for expertise in this growing field, CIRC is contributing significantly towards nurturing young talent specialised in clinical bio-imaging, as a regional training site assigned by the International Atomic Energy Agency for physicists.

Mr Lim Chuan Poh, Chairman of A*STAR, said, "CIRC is an invaluable resource in our quest for new therapies to treat diseases common to Singapore and the

⁴ http://www.imh.com.sg/uploadedFiles/Newsroom/News_Releases/23Mar15_WiSE%20Study%20Results.pdf

region. By fostering closer collaboration between scientists and clinicians from both the public and private sectors, and catalysing the translation of research findings into clinical outcomes, CIRC will lead the way as a clinical bio-imaging hub for the region.”

Professor Tan Chorh Chuan, President of NUS, said, “Cutting edge techniques for human imaging are absolutely vital for gaining deep insights into diseases important to Singapore, and in developing and evaluating new treatment approaches. The Centre’s close proximity to NUS Faculties and the National University Hospital is a major advantage as it allows basic science researchers and clinicians to work iteratively together on patient related biomedical research. In addition, it provides an ideal environment for the training and development of future scientists and clinician-investigators.”

Professor David Townsend, Director of CIRC, said, “As CIRC reaches full functionality, it is now poised to bring greater healthcare benefit to patients in Singapore and beyond through translational clinical research and imaging.”

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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 the National University of Singapore (NUS)

A leading global university centred in Asia, the National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education and research, with a focus on Asian perspectives and expertise.

NUS has 16 faculties and schools across three campuses. Its transformative education includes a broad-based curriculum underscored by multi-disciplinary courses and cross-faculty enrichment. Over 38,000 students from 100 countries enrich the community with their diverse social and cultural perspectives.

NUS has three Research Centres of Excellence (RCE) and 26 university level research institutes and centres. It is also a partner in Singapore's fifth RCE. NUS shares a close affiliation with 16 national-level research institutes and centres. Research activities are strategic and robust, and NUS is well-known for its research strengths in engineering, life sciences and biomedicine, social sciences and natural sciences. It also strives to create a supportive and innovative environment to promote creative enterprise within its community.

This year, NUS celebrates its 110th year of founding together with Singapore's 50th year of independence. As the island's first higher education institution

established by the local community, NUS prides itself in nurturing generations of leaders and luminaries in Singapore and Asia.

For more information on NUS, please visit www.nus.edu.sg. Details on NUS' 110th Anniversary celebrations are available at nus110.sg.