

MEDIA RELEASE

For immediate release

Novel link between unhealthy hearts and dementia

New findings suggest that cardiac disease could lead to loss of brain function such as cognitive impairment and dementia due to “silent” mini-strokes.

Singapore, 22 March 2017 – Researchers from National University Health System (NUHS) have discovered a link between cardiac diseases and brain dysfunction. The findings by a joint team of cardiovascular and brain researchers uncovered a strong association between cardiac diseases and tiny brain lesions called cerebral microinfarcts (CMIs) which are commonly found in patients with cognitive impairment or dementia.

The study is a collaboration between two research centres of NUHS, the Cardiovascular Research Institute (CVRI) and the Memory Ageing and Cognition Centre (MACC). The results were published in *JAMA Neurology*¹, a journal of the American Medical Association, and suggest that treating cardiac dysfunction could also help to prevent CMI-related brain injury. Previous studies have shown that the presence of CMIs is relatively uncommon in elderly individuals without dementia (24%), but more common in patients diagnosed with Alzheimer’s disease (43%) or vascular dementia (62%).

“Our findings suggests that the development of these tiny brain lesions, which are closely linked to diseases like dementia, may be caused by chronic heart problems and vascular disease,” said Associate Professor Christopher Chen, Director of MACC. CMIs were previously considered impossible to detect in living patients but the team had used higher field strength (3Tesla) magnetic resonance imaging (MRI) to identify CMIs in the brain of living persons. “In an earlier study, we showed these microinfarcts were associated with cognitive dysfunction, and now we show that they are also associated with clinical and subclinical cardiac disease,” added lead author, Dr Saima Hilal, a visiting Research Fellow at the MACC and post-doctoral scientific researcher at the Erasmus Medical Center, Rotterdam, Netherlands.

The researchers studied a sample size of 243 elderly participants (average age 72 years). The presence of cortical CMIs was strongly associated not only with clinically overt cardiac disease but also with blood cardiac biomarkers. Repeat analysis after exclusion of individuals with clinically overt cardiac disease showed a correlation of the number of cortical CMIs with blood biomarkers of subclinical cardiac disease. A rise in cardiac markers was accompanied by an increased risk of developing CMIs.

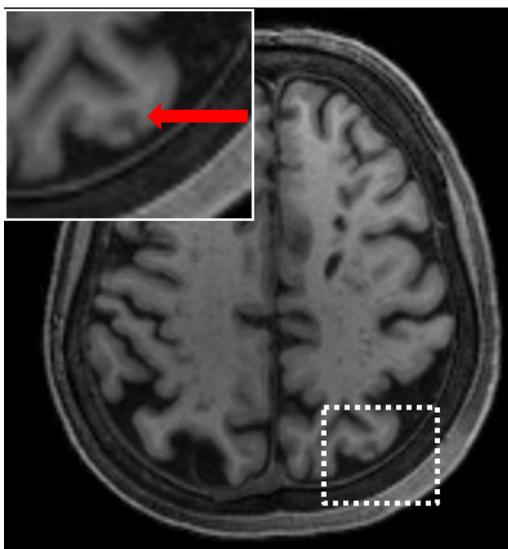
“Apart from signalling problems with the heart, these cardiac biomarkers are also indicators of injury to circulatory and blood vessel systems in other organs, for example the brain. Our selected cardiac markers are powerful predictors of the presence of CMIs and cognitive impairment, and may provide scientists and clinicians with tools for the prevention or timely treatment of brain-related diseases,” said Professor Arthur Mark Richards, Director of CVRI

¹ “Association Between Subclinical Cardiac Biomarkers and Clinically Manifest Cardiac Diseases With Cortical Cerebral Microinfarcts”; *JAMA Neurol.* Published online February 6, 2017. doi:10.1001/jamaneurol.2016.5335

at NUHS' National University Heart Centre, Singapore (NUHCS), and Professor, Department of Medicine, National University of Singapore (NUS). Research teams at both CVRI and in Prof Richards' New Zealand laboratory have pioneered the use of cardiac biomarkers in detecting and monitoring heart disease, and in linking them to circulatory problems elsewhere in the body.

The success of the study leverages the cross-disciplinary research that exists in NUHS to advance cutting-edge translational biomedical research. The combination of close research collaboration between experts from different disciplines, such as the heart and brain, and access to advanced research tools like the 3Tesla MRI at the A*STAR-NUS Clinical Imaging Research Centre (CIRC) that was used in identifying CMLs, was instrumental in enabling this advance.

The researchers are looking to expand the study to gain a better understanding of the role that cardiac dysfunction plays in the development of CMLs, and if the findings are applicable to non-Asian populations who may have different risk profiles. Further studies may also determine if treatments for cerebrovascular disease-related cognitive impairment can be achieved by targeting cardiac disease.



Cerebral microinfarct visible on 3T MRI scan provided by Clinical Imaging Research Centre (CIRC). The white dashed box indicates the area with a cerebral microinfarct, which is shown in the magnified view, and red arrow.

Image credit: A*STAR-NUS Clinical Imaging Research Centre (CIRC)

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About the National University Health System (NUHS)

The National University Health System (NUHS) is an integrated Academic Health System and Regional Health System in Singapore that delivers value-driven, innovative and sustainable healthcare.

Throughout the history of our institutions, our staff has worked across the health system to advance the tripartite missions of achieving clinical excellence, developing the next generation of healthcare professionals, and changing the natural history of chronic diseases through research.

At NUHS, we leverage our unique position as an academic health system to tap on the wealth of resources residing within the whole of the National University of Singapore (NUS). Through collaborations with NUS faculties, we are able to draw upon their academic, research and creative capabilities to develop solutions for existing and emerging health and healthcare needs of the Singapore population.

As part of our regional health system responsibility, we work in close collaboration with community hospitals, general practitioners, family medicine clinics, nursing homes and other community and social partners to provide integrated care to the community.

Institutions in the NUHS group include three hospitals - National University Hospital (NUH), Ng Teng Fong General Hospital and Jurong Community Hospital; three National Specialty Centres - National University Cancer Institute, Singapore (NCIS), National University Heart Centre, Singapore (NUHCS) and National University Centre for Oral Health, Singapore (NUCOHS); a polyclinic group - the National University Polyclinics (NUP); one medical centre – Jurong Medical Centre; and three academic health sciences institutions – NUS Yong Loo Lin School of Medicine (including the Alice Lee Centre for Nursing Studies), NUS Faculty of Dentistry and NUS Saw Swee Hock School of Public Health.

With member institutions under one academic health system, NUHS creates synergies as a fully integrated cluster to provide seamless care from prevention to home care, and with our academic institutions, to continue to develop solutions for Singapore's healthcare challenges, and nurture the next generation of healthcare professionals.

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