

Scientists from the Singapore Institute of Clinical Sciences (SICS) and the National University of Singapore (NUS) shed light on the causes of muscle wasting in elderly

Researchers have identified the mechanisms involved in sarcopenia – a debilitating age-related loss of muscle mass and strength – through a study by SICS and NUS researchers in collaboration with Nestlé Research and the EpiGen Global Research Consortium.



Singapore, January 2020 – In a unique study comparing the muscle tissue from older people with sarcopenia across different geographies, scientists from SICS and NUS, in partnership with Nestlé Research and the EpiGen Global Research Consortium, have gained fresh insight into the biological mechanisms behind how skeletal muscles lose their mass and strength as people age.

Sarcopenia is a significant contributor of frailty in the elderly. It affects the individual's gait speed, balance, and overall ability to perform daily tasks. With an increase in the ageing population, this debilitating health condition is becoming a serious global public health epidemic.

Published in *Nature Communications*, the MEMOSA study (Multi-Ethnic MOlecular determinants of human SARcopenia) found that the activity of the key energy-producing pathway involved in maintaining muscle strength and function was markedly reduced in the muscles of individuals with sarcopenia. Results also showed that sarcopenia was associated with lower levels of NAD⁺, a molecule critical for regulating energy production. These observations were found in the Singapore cohort of the study and replicated in cohorts from the UK and Jamaica.

The MEMOSA study has allowed researchers to identify changes in the cells and molecules within muscle, which may shed light on why some people develop sarcopenia in old age while others do not. These findings will benefit future interventions to improve the health span of the ageing population, and also reduce the cost of long-term care.

“Loss in muscle mass and muscle strength accelerates with ageing, and this condition is affecting the physical potential and health span of our ageing population. Sarcopenia has become a major health concern in Singapore and worldwide, enticing researchers to develop deeper insights into the biological mechanisms contributing to it. The study is a

substantial leap in this direction, as it unfolds the mechanisms compromised within the muscle of susceptible individuals, and is also generic to geographically diverse populations,” says Dr Neerja Karnani, one of the lead authors on this study and a Senior Principal Investigator at SICS.

Lead Clinician from the Singapore Sarcopenia Study and an Associate Professor with the Department of Paediatrics at the NUS Yong Loo Lin School of Medicine, Associate Professor Stacey Tay, shares, “This study is pivotal in establishing the central role mitochondrial bioenergetics dysfunction plays in the development of sarcopenia and therefore offers a hope to modify outcomes by improving mitochondrial function through available drugs, exercise and nutrition.

“Sarcopenia is a great concern in Singapore’s rapidly ageing population where increasing healthcare dollars have been devoted to the care of chronic illness and loss of mobility in the elderly. Identifying the key molecular mechanisms of sarcopenia and frailty provides clinicians with viable targets for therapy.”

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The paper ***Mitochondrial oxidative capacity and NAD+ biosynthesis are reduced in human sarcopenia across ethnicities*** is published in the journal *Nature Communications* (DOI: 10.1038/s41467-019-13694-1), and is available online at <https://www.nature.com/articles/s41467-019-13694-1>.

About the Singapore Institute for Clinical Sciences

Founded in 2007, the Singapore Institute for Clinical Sciences’ (SICS) mission is to promote health and human capacity in Singapore, Asia and globally. The first institute within the Agency for Science, Technology and Research (A*STAR) to focus on clinical sciences and translational research, SICS posits that health has its origins in good beginnings and continued interactions between our physiological makeup and environment. To fulfil our vision of building gateways and an evidence base for positive health, our institute strongly promotes clinical research that supports the understanding of metabolism, neuroscience and nutrition. By paving the way for scientific research to make a difference to the social and economic fabric of our communities, we are committed to ‘Changing Tomorrow’s Health, Today’.

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To read about Nestlé Research’s involvement in the study, please visit:

<https://www.nestle.com/randd/news/allnews/healthy-aging-muscle-health>

For more information on EpiGen Global Research Consortium, please visit:

<https://www.epigenrc.com/>