

Singapore researchers discover causes of muscle wasting in elderly

10 January 2020 | News

Researchers have gained new insight into the mechanisms involved in how skeletal muscles lose their mass and strength as people age, called sarcopenia



Sarcopenia is common in older people and is an important contributor to frailty. It affects balance, the way a person moves and their overall ability to perform daily tasks. With an aging population, sarcopenia is a serious global public health problem.

In the first-ever study to compare muscle tissue from groups of older people with sarcopenia across different geographies, researchers identified changes in the cells and molecules within the muscle, which may explain why some people develop sarcopenia and some people do not.

The study found that the muscle from individuals with sarcopenia had reduced activity of the key energy-producing pathway and a decrease in the activity of the components that make up all five complexes in the energy production pathway. Normal activity of the energy production pathway is critical to maintaining muscle strength and function.

These changes were found in the cohort of men from the Singapore cohort of the study and replicated in cohorts from the UK (Hertfordshire Cohort Study) and Jamaica. Moreover, results showed that sarcopenia was also associated with reduced levels of enzymes involved in the recycling of NAD⁺, which acts as a metabolic sensor in the cell and regulates energy production pathways.

The MEMOSA study (Multi-Ethnic MOlecular determinants of human SArcopenia), was undertaken by the EpiGen Global Research Consortium in partnership with Nestlé Research.

The MEMOSA team now plans to explore why the changes in the energy-producing pathway occur and are looking at genomic and nutritional factors.

Dr Neerja Karnani, one of the lead authors on this study and a Senior Principal Investigator at the Singapore Institute for Clinical Sciences, A*STAR, commented: "Decline in muscle mass and muscle strength accelerates with aging, affecting the physical potential and healthspan of the elderly. This has been recognized worldwide as a major health concern, enticing

researchers to develop deeper insights into the underlying molecular mechanisms. Findings from this study are a substantial leap in this direction, as they not only unfold the mechanisms compromised within the muscle of susceptible individuals, but are also relevant to ethnically and geographically diverse populations.”

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.”