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Singapore strategises advance modalities for cancer- and age-related muscle degeneration

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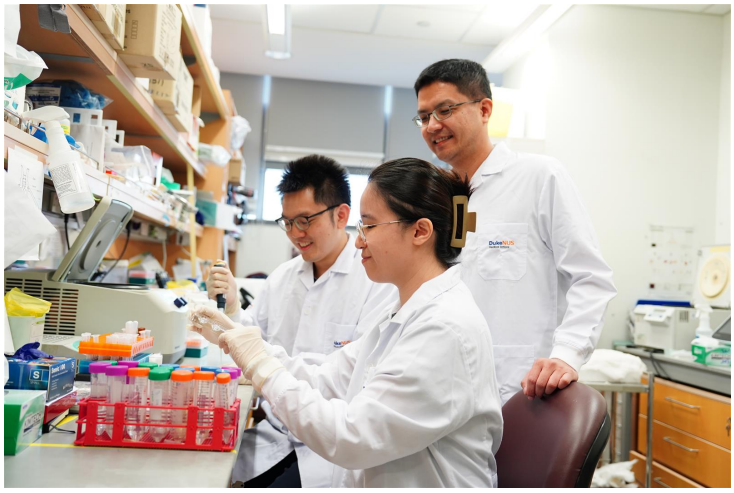
Duke-NUS scientists identified a protein that regulates cellular clean-up and may hold key to new treatments for age-related muscle loss and muscle wasting in cancer patients, enhancing quality of life



The global population is aging rapidly, and sarcopenia, a condition that severely diminishes quality of life in older adults, is becoming an urgent public health concern. Scientists at Singapore's Duke-NUS Medical School have made a new discovery that may lead to improved treatments.

Scientists found that the levels of a certain type of protein, called DEAF1 (Deformed epidermal autoregulatory factor-1), need to be maintained within optimal levels to sustain muscle repair and regeneration—a process that often becomes defective with ageing, or as a consequence of illnesses like cancer. This insight could lead to new treatments for conditions related to muscle degeneration, such as sarcopenia and cachexia.

During the study, muscle stem cells were highlighted as important for muscle repair and regeneration. These specialised cells are needed to replace muscle tissue that has been damaged or lost because of injury or stress. In sarcopenia, muscle stem cells become less effective with age, contributing to muscle loss.

In exploring the role of DEAF1 in muscle stem cell functionality and regeneration, the researchers found that DEAF1 regulates autophagy, a vital process that allows cells to eliminate and recycle damaged components. DEAF1 plays a crucial role in managing autophagy in muscle stem cells, which maintains muscle health.

Strategies aimed at modifying DEAF1 levels could benefit cancer patients suffering from cachexia, a serious condition characterised by significant muscle wasting. Cachexia differs from sarcopenia in being associated with chronic illnesses like cancer, and involves different underlying mechanisms. Therefore, treatment strategies should address the specific biological pathways associated with each condition.

Image : Duke-NUS PhD candidate Ms Lee Wen Xing (front) characterised the DEAF1 phenotype in Drosophila after performing a genetic screen to identify regulators of muscle maintenance in fruit lies. Together with Dr Goh Kah Yong (back), a research fellow, she is co-first author of the study which was led by senior author Assistant Professor Tang Hong-Wen (centre) // Credit: Duke-NUS Medical School