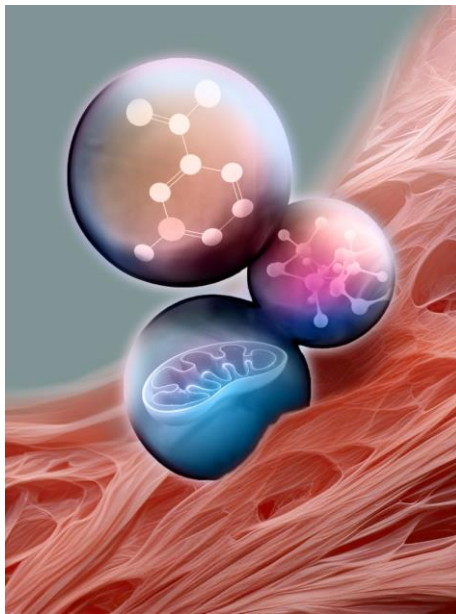


PRESS RELEASE

21 MARCH 2024 | FOR IMMEDIATE RELEASE

Natural molecule found in coffee and human body increases NAD⁺ levels, improves muscle function during ageing



Trigonelline (top bubble), a natural molecule found in the human body and certain food items, has been found to decline during sarcopenia, and improve physical performance during ageing by enhancing NAD⁺ levels (middle bubble) and mitochondrial activity (lower bubble).

Credits: Yong Loo Lin School of Medicine, NUS

21 March 2024 – A research consortium led by Nestlé Research in Switzerland and the Yong Loo Lin School of Medicine, National University of Singapore (NUS Medicine) made a recent discovery that the natural molecule trigonelline present in coffee, fenugreek, and also in the human body, can help to improve muscle health and function. In an international collaboration among the University of Southampton, University of Melbourne, University of Tehran, University of South Alabama, University of Toyama and University of Copenhagen, the work builds on a [previous collaborative study](#) that described novel mechanisms of [human sarcopenia](#).

Sarcopenia is a condition where cellular changes that happen during ageing gradually weaken the muscles in the body and lead to accelerated loss of muscle mass, strength and reduced physical independence.

One important problem during sarcopenia is that the cellular cofactor NAD⁺ declines during ageing, while mitochondria, the energy powerhouses in our cells, produce less energy. The study team discovered that levels of trigonelline were lower in older people with sarcopenia. Providing this molecule in pre-clinical models resulted in increased levels of NAD⁺, increased mitochondrial activity and contributed to the maintenance of muscle function during ageing.

NAD⁺ levels can be enhanced with different dietary precursors like the essential amino acid L-tryptophan (L-Trp), and vitamin B3 forms such as nicotinic acid (NA), nicotinamide (NAM), nicotinamide riboside (NR) and nicotinamide mononucleotide (NMN).

Assistant Professor Vincenzo Sorrentino from the Healthy Longevity Translational Research Programme at NUS Medicine added, “Our findings expand the current understanding of NAD⁺ metabolism with the discovery of trigonelline as a novel NAD⁺ precursor and increase the potential of establishing interventions with NAD⁺-producing vitamins for both healthy longevity and age-associated diseases applications”.

Nutrition and physical activity are important lifestyle recommendations to maintain healthy muscles during ageing. “We were excited to discover through collaborative research that a natural molecule from food cross-talks with cellular hallmarks of ageing. The benefits of trigonelline on cellular metabolism and muscle health during ageing opens promising translational applications,” said Jerome Feige, Head of the Physical Health department at Nestlé Research.

The journal paper, titled [*Trigonelline is an NAD⁺ precursor that improves muscle function during ageing and is reduced in human sarcopenia*](#), was published in Nature Metabolism on 19 March 2024.

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About National University of Singapore (NUS)

The National University of Singapore (NUS) is Singapore’s flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 16 colleges, faculties and schools across three campuses in Singapore, with more than 40,000 students from 100 countries enriching our vibrant and diverse campus community. We have also established more than 20 NUS Overseas Colleges entrepreneurial hubs around the world.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, research centres of excellence, corporate labs and more than 30 university-level research institutes focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

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About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

The NUS Yong Loo Lin School of Medicine is Singapore's first and largest medical school. Our enduring mission centres on nurturing highly competent, values-driven and inspired healthcare professionals to transform the practice of medicine and improve health around the world.

Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives. The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is one of the leading medical schools in Asia and ranks among the best in the world (Times Higher Education World University Rankings 2024 by subject and the Quacquarelli Symonds (QS) World University Rankings by subject 2023).

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