Nestlé scientists find new metabolic clues to living longer and healthier

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Though the “Fountain of Youth” is yet to be discovered, Nestlé scientists are taking the scientific approach to understanding the mysteries of long life and healthy ageing.

Scientists from the Nestlé Research Center, Lausanne, Switzerland, and the Nestlé Institute of Health Sciences, Lausanne, Switzerland, in collaboration with Bologna University, Bologna, Italy, identified for the first time, the molecular footprints of longevity. The current study published in the PLOS ONE journal reports their discovery of the metabolic phenotype of healthy human ageing and longevity.

A total of 396 study volunteers, ranging in age from 21-111 years, were recruited from northern Italy. They were divided into three age groups: centenarians (mean age 101 years) representing the model of healthy ageing; elderly (mean age 70 years); and young adults (mean age 31 years). To assess the influence of parental longevity on health outcomes, the “elderly” age group was divided into two subgroups: the offspring of non long-lived parents and the offspring of centenarians.

The physical and cognitive health status of study volunteers was assessed and blood and urine samples were collected. The blood and urine samples were analyzed with a metabonomics approach (the monitoring of individual metabolism) to uncover metabolic signatures of the ageing process.

Analysis of the blood samples revealed that specific lipids (glycerophospholipids and sphingolipids) were uniquely altered in centenarians. Centenarians also displayed a set of compounds circulating in remarkably similar levels as the group of young volunteers. These collective changes observed in centenarians’ lipid profiles suggest their distinctive ability to adapt and respond to the oxidative and chronic inflammatory conditions which typically occur during ageing, thus favouring longevity.

Interestingly, in the elderly group of volunteers, there were significant metabolic differences between the offspring of centenarians vs. offspring of non long-lived parents. This indicates a distinctive ageing metabolic phenotype for the offspring of longevity parents.

Data also revealed that the longevity process deeply affected the structure and composition of the gut microbiota. The observed changes in urinary metabolites of the centenarians suggest that a complex metabolic remodeling occurs, including that of gut microbiota, creating a beneficial balance between inflammatory and anti-inflammatory processes.
These metabolic signatures of longevity and healthy lifespan provide new scientific insight into the healthy ageing phenotype. "Discovering the metabolic phenotype of longevity for the first time is an exciting step in understanding the biological mechanisms of ageing. This knowledge will help us to reveal the key processes necessary for the elderly to maintain good health and live longer," said Dr. Sebastiano Collino, Nestlé scientist leading the study.

Our newly reported metabolic footprint for longevity needs further validation across different populations and genetic backgrounds. Once validated, this comprehensive knowledge will help us to better understand and assess the influence of nutrition and lifestyle interventions on ageing and longevity," concluded Dr. Collino.

Nestlé's ultimate goal is to provide nutrition solutions that help prevent or manage chronic diseases, to promote healthy ageing and optimal quality of life.

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