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Application of metabolomics to investigate metabolic change in normal aging process

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Abstract

Aging can be envisioned as a shift from fully functional to failing-to-function.

The system-wide deterioration that we observe as organisms age likely involves a combination of some or all of these mechanisms working together to create the complex phenomenon, thus it is regarded as a result of constant remodeling process. Accordingly, meaningful alternation in the cellular metabolism is observed during aging. Metabolomics informed important clues to understand systemic change in aging because it facilitates profiling progressive changes over time, at the small molecular level.

In the present study, metabolism processes relevant to the normal aging process were investigated with non-targeted metabolomics using liquid chromatography-mass spectrometry. To exclude physiological and environmental differences, the metabolite profiles and relevant metabolic pathways were analyzed in the plasma from two separated study groups consisting of age and gender balanced healthy individuals. The first group was recruited from an urban hospital, and the second group was recruited from a rural community.

The alteration in lipid metabolism including beta-oxidation of fatty acid, metabolism of glycerophospholipid and sphingolipid were dominant during normal aging. Especially, sphingosine, long-chain acylcarnitine, and lysoPCs showed critical metabolic change. Those metabolites are related to the alteration of redox homeostasis and dysregulation of the immune system, the primary putative aging mechanisms.From these results, we concluded that the present study can play critical parts to complete the whole picture of aging process.

Biography

Byung Hwa Jung has completed her Ph.D. from Seoul National University at 2000 and postdoctoral studies from University of North Carolina at Chapel Hill, school of pharmacy at 2004. She is a principal researcher and Center Head of Molecular Recognition Research Center, at Korea Institute of Science and Technology (KIST). She is also an Adjunct Professor of University of Science and Technology. She has published more than 60 papers in reputed journals and serving as an editorial board member of repute.

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