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Elevation in liver function marker (alanine aminotransferase) and plasma metabolites with aging

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The aim of this study was to identify age-related metabolite changes associated with elevated serum alanine aminotransferase (ALT) and to explore possible underlying mechanisms. The study included 602 healthy, nondiabetic subjects (aged 30–65 years); 393 individuals had normal ALT levels at baseline. Fifty individuals developed elevated ALT levels after 3 years. The remaining 340 subjects with normal ALT were matched to the elevated-ALT group (n=50) for age, gender, BMI, fasting glucose, and ALT to form the control group (n=50). At the 3-year follow-up, the elevated-ALT group exhibited greater increases in waist circumference, free fatty acid, ALT, aspartate aminotransferase (AST), γ-glutamyltransferase (GGT), bilirubin, oxidized LDL, Lp-PLA2 activity, urinary 8-epiprostaglandin F2α (8-epi-PGF2α), and brachial-ankle pulse-wave velocity (ba-PWV) compared to the control group after adjusting for baseline. The elevated-ALT group exhibited greater increases in plasma L-valine (q=0.014), L-leucine (q=0.007), L-phenylalanine (q=0.006), and decanoylcarnitine (q<0.001). Mean ALT levels increased in a linear fashion with increasing changes in these four metabolites, which correlated with changes in AST, GGT, Lp-PLA2 activity, urinary 8-epi-PGF2α, and ba-PWV. Mean ALT changes did not significantly correlate with HOMA-insulin resistance. These findings suggest that increased plasma levels of L-valine, L-leucine, Lphenylalanine, and decanoylcarnitine precede insulin resistance during periods of elevated ALT and occur in conjunction with enhanced risk factors for cardiovascular disease, such as Lp-PLA2 activity, oxidative stress, and arterial stiffness.

Biography

Minjoo Kim has completed her PhD from Yonsei University. She is currently a Postdoctoral student in Research Center for Silver Science, Yonsei University. Her researches are focussed on medical nutrition therapy in metabolic diseases, aging, nutrition-related metabolomics, etc. She has published more than 24 papers in reputed journals and has registered 2 patents (also, 9 patent applications).

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