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Targeted Lipidomic and Kidney podocyte-specific Analysis Identifies Dysregulated Renal Lipid Metabolism in a Mouse Model of Chronic Kidney Disease

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Objectives: When end-stage kidney disease (ESKD) occurs in a kidney donor after donating a kidney, obese donors are known to have a higher incidence of ESKD than normal-weight donors.

Methods: Lipid metabolism analysis was performed by isolating podocytes from a UN model fed a high-fat diet. Compared to the HD group, podocytes in the HDU group increased cholesterol and fatty acids and significantly increased cholesteryl ester (CE) esterified by ACAT. Among the components of cholesteryl ester, CE20:4 (Cholesteryl arachidonic acid) increased most strongly in podocytes. In addition, the HD and HDU groups significantly increased serum BUN, Cr, and total cholesterol levels, and histological changes in the kidneys were observed. This result shows a disadvantage for lipid accumulation in unilateral kidneys.

Results: Lipid metabolism analysis was performed by isolating podocytes from a UN model fed a high-fat diet. Compared to the HD group, podocytes in the HDU group increased cholesterol and fatty acids and significantly increased cholesteryl ester (CE) esterified by ACAT. Among the components of cholesteryl ester, CE20:4 (Cholesteryl arachidonic acid) increased most strongly in podocytes. In addition, the HD and HDU groups significantly increased serum BUN, Cr, and total cholesterol levels, and histological changes in the kidneys were observed. This result shows a disadvantage for lipid accumulation in unilateral kidneys.

Conclusions: CE accumulates in the kidneys and cause kidney damage. Specifically, CE 20:4 is responsible for high-fat diet-induced kidney damage in the unilateral kidney which can be a potential biomarker.