Searching for Biomarkers of Diabetic Nephropathy Using Proton NMR Metabolomics

Puckett, Ally

With more than 380 million people currently affected, diabetes has become a worldwide pandemic. About 30-40% of diabetics develop nephropathy and renal failure and will require dialysis or kidney transplantation. Much is still unknown about why the disease starts and how it causes damages to the kidneys and other organs in the body. Therefore, it is important to develop new biomarkers of diabetic nephropathy (DN) to help the development of novel therapeutics. The purpose of this research was to search for potential biomarkers of DN using non-diabetic mouse urine (C57BLKS) and diabetic mouse urine (eNOS-/-C57BLKS/J db/db). The eNOS-/-C57BLKS/J db/db mouse is the most advanced model of DN which exhibits many features of the human disease therefore urine from this model organism was used in this study. Proton NMR was employed to measure the different metabolites in the non-diabetic mouse urine as well as the DN mouse urine. The data collected in this research showed significant difference in the metabolites identified in the DN mouse urine as compared to the non-diabetic mouse urine metabolites. Proton NMR metabolomics is an experimental method which can identify different metabolites excreted in mouse urine. Knowledge about these metabolites helps to understand metabolic reactions in kidney and other organs affected by diabetes and can be used as diabetic biomarkers to identify the disease before organ damage occurs.

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