Possible breakthrough in reducing the complications of the disease

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(Medical Xpress) -- Newly published research from the Bruce Hammock lab at the University of California, Davis, and colleagues indicates a possible breakthrough in reducing the severity of complications associated with diabetes, including kidney, pain, inflammation and cardiac issues. The research, done with rodents, could lead to improved treatment of type 2 diabetes, a disease affecting nearly 30 million people in the United States alone.

"Inhibitors of the soluble epoxide hydrolase look very promising in animal models for reducing dramatically the severity of a number of problems associated with diabetes," said co-author Bruce Hammock, a distinguished professor of entomology at UC Davis and director of the UC Davis Superfund Research Program. "These benefits include a dramatic protection of kidney function, reduction in often debilitating neuropathic pain as well as a reduction in blood pressure, vascular inflammation and heart failure."

The genetic and pharmacological research, led by senior author Ayala Luria, now a researcher based in the Department of Urology at the UC Davis School of Medicine, is published today (May 12) in the Proceedings of the National Academy of Sciences (PNAS).

An estimated 25.8 million children and adults in the United States — 8.3 percent of the population — have diabetes; 7 million more are undiagnosed; and 79 million people are pre-diabetic, according to data from the 2011 National Diabetes Fact Sheet.

Luria, who continues to work in the Hammock lab, described type 2 diabetes as a complex disease in which a number of tissues are rendered "insulin resistant." Insulin action is mediated by a complex network of signaling events. "Epoxyeicosanoids or EETS are thought to be one of multiple classes of chemical mediators which influence insulin production and sensitivity," she said.

"Knowledge and data from this project," Luria said, "directly increases public awareness for the outcome of increasing insulin signaling, sensitivity and glucose homeostasis with the inhibition of soluble epoxide hydrolase and increasing endogenous levels of epoxy fatty acids in a model of diabetes type 2 induced by high fat diet."

"Using inhibitors of soluble epoxide hydrolase might produce therapeutically approach to reduce the burden and complications of insulin resistance and diabetes type 2," she said.

Luria joined the Hammock lab in 2004 to work on the molecular mechanism of soluble epoxide hydrolase in animal models. She previously held postdoctoral positions involving the structure of the plasma membrane and nuclear receptors during embryo development. She has a master's degree and doctorate in molecular biology and biochemistry from Bar Ilan University, Ramat Gan, Israel.

In the study, the 10-member research team investigated diet-inducted obesity and insulin resistance. They studied the role of the sEH gene in regulating glucose and the effects of sEH deletion and inhibition of body mass and obesity. The research involved the disruption of the Ephx2 gene; body weights, food intake and organ weights; metabolic measurements; immunohistochemistry.

"The research provides a perspective to what is emerging as a unifying theme in biological processes," said professor and chemist Bruce

German of the Department of Food Science and Technology. "In various ways, higher organisms, including humans, use redundant signaling system strategies to manage their various complex processes. As a consequence, dysfunctions in one signaling system can lead to multiple problems (syndromes) while at the same time, pharmacologically active substances acting on a single target can nonetheless act beneficially on a wide range of health outcomes. Fatty acid epoxides appear to be one of these multi-functional signaling systems."

More information: www.pnas.org/content/early/201 … 482108.full.pdf+html

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