Study shows an improved way to model type 2 diabetes in mice

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Type 2 diabetes affects the lives of millions of Americans and is estimated to cost $327 billion in health care and productivity lost annually. It is also associated with pain, lower urinary tract or bladder

dysfunction, depression and systemic inflammation, affecting quality of life for patients. To investigate that, scientists most commonly utilize animal models—mice specifically—to explore potential treatments, which may not reflect the complexity of the condition, a study has found.

The University of Alabama at Birmingham's Robert Sorge, Ph.D., associate professor in the College of Arts and Sciences' Department of Psychology, along with Asia Wiggins, his doctoral student in the Behavioral Neuroscience Graduate Program, Timothy Kraft, Ph.D., professor in the School of Optometry's Department of Opthalmology and Vision Science, and Anas Alsulami, lab manager, have published a study in the journal *Physiology and Behavior* that shows an improved way to model type 2 diabetes in mice.

Generally, despite the evidence that carbohydrates are an underlying cause for type 2 diabetes and the first-line treatments are aimed at reducing carbohydrates, preclinical studies utilize high-fat diets almost exclusively. Sorge's study examined whether the common symptoms of type 2 diabetes were better modeled with the standard high-fat diet or a higher-carbohydrate diet that he developed, called the Standard American Diet.

The researchers fed several diets to mice over the course of 35 weeks and found that the common symptoms of glucose intolerance, slower wound recovery, changes in retinal responses to light and retinal thickness were modeled by their SAD, but not the HFD. Interestingly, the HFD resulted in obesity, but that was not related to the other symptoms.

"The goals of the study were to determine whether we could develop and validate an improved model of type 2 diabetes in mice that replicated more of the constellation of problematic symptoms seen in clinical

populations," Sorge said. "We were able to demonstrate that our diets resulted in a type 2 diabetes-related phenotype and that obesity was not necessary for symptom development."

Sorge believes preclinical models of type 2 diabetes should focus on human-relevant diets that aid in the development of a host of disorder-specific conditions. "Better models may produce better data and allow for early detection strategies to be developed and tested," he said.

Building on the findings of this study, Sorge will continue to examine more symptoms related to type 2 diabetes and investigate the time course of symptom development. That could determine whether specific biological changes can signal the future development of type 2 diabetes, to aid in detection and prevention.

More information: Asia M. Wiggins et al, Corrigendum to "An improved model of type 2 diabetes with effects on glucose tolerance, neuropathy and retinopathy with and without obesity"☆, *Physiology & Behavior* (2022). DOI: 10.1016/j.physbeh.2022.113823

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