Researchers link Western diet to vascular damage and prediabetes

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Could short-term exposure to the average American diet increase one's risk for developing diabetes and cardiovascular disease? According to a recent study funded by the American Heart Association (AHA),

researchers from New York Institute of Technology College of Osteopathic Medicine (NYITCOM) provide compelling evidence to support this hypothesis.

With the obesity epidemic worsening in the United States, many researchers have sought to connect diabetes and cardiovascular diseases to the consumption of the American diet, also known as the "western diet." Categorized by excessively high levels of fat and refined sugars, the diet has been shown to cause metabolic syndrome (prediabetes) in male rats. Now, research from NYITCOM has proven that the western diet can cause equally unsettling results among females, a population which possesses protective hormones aiding in the prevention of cardiovascular diseases.

For five months, researchers Maria Alicia Carrillo Sepulveda, Ph.D., assistant professor of Biomedical Sciences at NYITCOM, and Benjamin Kramer, fourth-year medical student, exposed the animals to a meal supplement resembling the ingredients of the typical American diet, regularly feeding them pellets with an appearance and scent similar to fast-food French fries. Following this short-term exposure, the researchers discovered that the rats' blood vessels displayed damage and increased blood pressure, symptoms common among diabetics. Surprisingly, the rats developed approximately four times more abdominal fat, a risk factor for type 2 diabetes, than their control group counterparts, which received a normal maintenance chow diet.

Perhaps most alarming is that while vascular damage and increased blood pressure were clearly detected, the female rats did not appear outwardly obese, and had not yet experienced the typical warning signs presented by diabetes, such as an increase in blood glucose (>125mg/dL) and hemoglobin A1c levels (>6.4%). The researchers further confirmed the negative effects of the western diet among female rodents and also identified that prediabetes could develop long before the traditional

biomarkers are found to be abnormal.

"Our findings suggest that short-term exposure to the western diet can put individuals at risk for developing vascular damage long before the tell-tale signs of diabetes are present. This may explain why some diabetics who successfully manage their blood glucose still experience other cardiovascular diseases, like hypertension, even while receiving treatment," said Carrillo-Sepulveda, whose work also suggests that the western diet may cause persistent modifications in vascular proteins.

Kramer, who received the 2017 American Heart Association Student Scholarship in Cardiovascular Disease, noted that the study reinforces the value of an osteopathic medical education, which trains physicians to consider the overarching consequences of disease, and its impact on the care and lifestyle of a patient, rather than simply treating an ailment.

"This experiment reminds us that focusing solely on one aspect of disease does not adequately tell the complete story of one's health," argues Kramer. "Without the presence of traditional biomarkers, there were still multiple indications suggesting the onset of prediabetes, and we would have been unaware of dire medical conditions had we simply been looking for the conventional signs."

Making a case for physicians to address the cultural environment around their patients in order to fully treat them, Kramer notes, "Translating the study results to potential patients, the problem is the food our patients are eating. If we can educate and encourage them to make better food choices, we can play a key role in the prevention of the development of diabetes."

Continuing the investigation, Carrillo Sepulveda aims to explore the hypothesis known as "metabolic memory," a concept that suggests that despite healthy eating habits and physical activity later in life, exposure

to the western diet at a young age can affect one's disposition to diabetes.

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