Interventions for type 2 diabetes successful across the genetic landscape

July 25 2019

As the number of people with type 2 diabetes soared to 8.8 percent of the population by 2017, a growing public health movement has sought to know if tailoring dietary recommendations to specific genetic profiles might help reduce the risk of the disease in susceptible individuals. A team of researchers from Massachusetts General Hospital (MGH) has now found that the quality of dietary fat consumed and the genetic risk of diabetes work independently of each other, and that a diet rich in polyunsaturated fats can be safely applied across the spectrum of type 2 diabetes genetic risk.

"Our meta-analysis shows on a scale never done before that there is no apparent need to be concerned about the genetic risk to inform sound dietary recommendations for individuals with type 2 diabetes," says Jordi Merino, RD, Ph.D., of the MGH Diabetes Unit and Center for Genomic Medicine, and corresponding author of the study published online in the *BMJ*. "This means that lifestyle or dietary interventions for the prevention of type 2 diabetes can be deployed across all gradients of genetic risk since genetic burden does not seem to impede their effectiveness."

Recommendations aimed at improving dietary quality have become an integral part of the worldwide public health effort to stem the rampant growth of diabetes. The MGH investigators found that irrespective of genetic risk, consuming more polyunsaturated fat (such as omega 3 and omega 6 fatty acids) in place of refined starch and sugars is associated with a lower risk of type 2 diabetes, while consuming more

monounsaturated fat in place of carbohydrates is associated with a higher risk of the metabolic disease. In North America, monounsaturated fats typically derive from animal sources of food such as red meat, dairy and full-fat dairy products.

Merino emphasizes another important finding of the study that transcends the issue of dietary fat. "The positive association between polygenic scores and type 2 diabetes we reported acknowledges the fact that people at higher genetic risk could benefit from additional strategies that have nothing to do with dietary fat intake," he says.

The MGH study included more than 102,000 participants of European descent who were free from diabetes at baseline. These individuals were culled from 15 cohort studies and followed over 12 years. In finding no appreciable interaction between dietary components and diabetes type 2 risk-increasing genes, the analysis concurs with the national Diabetes Prevention Program which demonstrated that lifestyle modification is effective regardless of the genetic burden for type 2 diabetes. The MGH findings are also consistent with recent evidence around coronary artery disease, which has led to heart-healthy lifestyle and dietary regimens being promoted across the genetic landscape.

The picture is somewhat different with obesity, however, where increasing evidence has shown that unhealthy dietary or certain lifestyle patterns like sugar, sweetened drinks, fried foods and physical inactivity might interact with genetic susceptibility to elevate body mass index (BMI). Looking to explain the dichotomy, Merino says, "The metabolic complexity of type 2 diabetes and coronary heart disease may account for the lack of interaction between lifestyle factors and genetic background."

Provided by Massachusetts General Hospital