

## **Study is the first to show higher dietary acid load increases risk of diabetes**

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A study of more than 60 000 women has shown that higher overall acidity of the diet, regardless of the individual foods making up that diet, increases the risk of type 2 diabetes. The study, the first large prospective study to demonstrate these findings, is published in *Diabetologia*, the journal of the European Association for the Study of Diabetes (EASD), and is by Dr Guy Fagherazzi and Dr Françoise Clavel-Chapelon, Center for Research in Epidemiology and Population Health, INSERM, Paris, France, and colleagues.

A western diet rich in animal products and other acidogenic foods can induce an acid load that is not compensated for by fruit and vegetables; this can cause chronic metabolic acidosis and lead to metabolic complications. Most importantly from a blood-sugar control perspective, increasing acidosis can reduce the ability of insulin to bind at appropriate receptors in the body, and reduce insulin sensitivity. With this in mind, the authors decided to analyse whether increased acidosis caused by dietary acid loads increased the risk of type 2 diabetes.

A total of 66,485 women from the E3N study (the French Centre of the European Prospective Investigation into Cancer and Nutrition, a well-known ongoing epidemiological study) were followed for new diabetes cases over 14 years. Their dietary acid load was calculated from their potential renal acid load (PRAL) and their net endogenous acid production (NEAP) scores, both standard techniques for assessing dietary acid consumption from nutrient intake.

During follow-up, 1,372 new cases of incident type 2 diabetes occurred. In the overall population, those in the top 25% (quartile) for PRAL had a 56% increased risk of developing type 2 diabetes compared with the bottom quartile. Women of normal weight (BMI of 25 and under) had the highest increased risk (96% for top quartile versus bottom) while overweight women (BMI 25 and over) had only a 28% increased risk (top quartile versus bottom). NEAP scores showed a similar increased risk for higher acid load.

The authors say: "A diet rich in animal protein may favour net acid intake, while most fruits and vegetables form alkaline precursors that neutralise the acidity. Contrary to what is generally believed, most fruits such as peaches, apples, pears, bananas and even lemons and oranges actually reduce dietary acid load once the body has processed them. In our study, the fact that the association between both PRAL and NEAP scores and the risk of incident type 2 diabetes persisted after adjustment for dietary patterns, meat consumption and intake of fruit, vegetables, coffee and sweetened beverages suggests that dietary acids may play a specific role in promoting the development of type 2 diabetes, irrespective of the foods or drinks that provide the acidic or alkaline components."

They conclude: "We have demonstrated for the first time in a large prospective study that dietary acid load was positively associated with type 2 diabetes risk, independently of other known risk factors for diabetes. Our results need to be validated in other populations, and may lead to promotion of diets with a low acid load for the prevention of diabetes. Further research is required on the underlying mechanisms."

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For a copy of the embargoed paper, see: <http://www.diabetologia-journal.org/files/Fagherazzi.zip>

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