

GUT

High dietary fibre intake linked to health promoting short chain fatty acids

Beneficial effects not limited to vegetarian or vegan diets

Eating a lot of fibre-rich foods, such as fruit, vegetables, and legumes—typical of a Mediterranean diet—is linked to a rise in health promoting short chain fatty acids, finds research published online in the journal **Gut**.

And you don't have to be a vegetarian or a vegan to reap the benefits, the findings suggest.

Short chain fatty acids (SCFAs), which include acetate, propionate, and butyrate, are produced by bacteria in the gut during fermentation of insoluble fibre from dietary plant matter. SCFAs have been linked to health promoting effects, including a reduced risk of inflammatory diseases, diabetes, and cardiovascular disease.

The researchers gathered a week's information on the typical daily diet of 153 adults who either ate everything (omnivores, 51), or were vegetarians (51), or vegans (51), and living in four geographically distant cities in Italy.

They also assessed the levels of gut bacteria and the 'chemical fingerprints' of cellular processes (metabolites) in their stool and urine samples.

The Mediterranean diet is characterised by high intake of fruit, vegetables, legumes, nuts and cereals; moderately high intake of fish; regular but moderate alcohol consumption; and low intake of saturated fat, red meat, and dairy products.

Most (88%) of the vegans, almost two thirds of the vegetarians (65%), and around a third (30%) of the omnivores consistently ate a predominantly Mediterranean diet.

The investigation showed distinct patterns of microbial colonisation according to usual dietary intake.

Bacteroidetes were more abundant in the stool samples of those who ate a predominantly plant based diet, while Firmicutes were more abundant in those who ate a predominantly animal products diet. Both these categories of organisms (phyla) contain microbial species that can break down complex carbohydrates, resulting in the production of SCFAs.

Specifically, *Prevotella* and *Lachnospira* were more common among the vegetarians and vegans while *Streptococcus* was more common among the omnivores.

And higher levels of SCFA were found in vegans, vegetarians, and those who consistently followed a Mediterranean diet.

Levels of SCFAs were also strongly associated with the quantity of fruit, vegetables, legumes, and fibre habitually consumed, irrespective of the type of diet normally eaten.

On the other hand, levels of trimethylamine oxide (TMAO)—a compound that has been linked to cardiovascular disease—were significantly lower in the urine samples of vegetarians and vegans than they were in those of the omnivores.

But the more omnivores closely followed a Mediterranean diet, the lower were their TMAO levels, the analysis showed.

TMAO levels were linked to the prevalence of microbes associated with the intake of animal proteins and fat, including *L-Ruminococcus* (from the *Lachnospiraceae* family).

Eggs, beef, pork and fish are the primary sources of carnitine and choline—compounds that are converted by gut microbes into trimethylamine, which is then processed by the liver and released into the circulation as TMAO.

The researchers point out that SCFA levels can naturally vary as a result of age and gender, and their study did not set out to establish any causal links.

But they nevertheless suggest that the Mediterranean diet does seem to be associated with the production of health promoting SCFAs.

They conclude: “We provide here tangible evidence of the impact of a healthy diet and a Mediterranean dietary pattern on gut microbiota and on the beneficial regulation of microbial metabolism towards health maintenance in the host.”

And they add: “Western omnivore diets are not necessarily detrimental when a certain consumption level of [plant] foods is included.”