

Low fiber diet can cause high blood pressure, international study finds

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Dr Francine Marques, a National Heart Foundation Future Leader at the Monash University School of Biological Sciences. Credit: Monash University

An international study co-led by Monash scientists has confirmed for the first time that low fiber diets may lead to high blood pressure—the 'silent disease' which affects one third of Australian adults.

If left untreated, [high blood pressure](#) can lead to stroke, myocardial

infarction, a stiffening of the arteries and the muscles of the heart, and a stiffening of the kidneys, reducing their function. It's the most common risk factor for cardiovascular disease.

The study, published today in *Circulation*, used mice to test the difference between high and low resistant starch diets.

Resistant starches are a type of prebiotic fiber, which resists digestion until it reaches the large intestine, where it feeds bacteria that are considered to have health benefits.

The results found that mice fed a low fiber diet were more predisposed to high [blood](#) pressure. Researchers performed fecal transplants on mice without any microbes, and found that only recipients of low fiber microbes went on to develop higher blood pressure.

"High blood pressure continues to be a major risk factor for cardiovascular death," said lead study author Dr. Francine Marques, a National Heart Foundation Future Leader at the Monash University School of Biological Sciences.

"A diet poor in fiber is associated with prevalence of high blood pressure, but this study is changing the concept of fiber intake being only protective: lack of fiber can actually contribute to high blood pressure and cardiovascular disease, and this happens via the [gut microbiota](#)."

Professor David Kaye, Director of Cardiology at Alfred Hospital and head of the Baker Institute Heart Failure, co-led the study. Professor Kaye said although it is known that a diet high in fiber may be protective towards the development of heart disease, the mechanism for this action remained uncertain.

"The study is significant," he said, "because it identifies for the first

time, how dietary fiber directly regulates [heart](#) and blood vessel health."

Microbial fermentation of resistant starches in the gut releases metabolites, such as small molecules called 'short-chain fatty acids (SCFAs)'. The research team found that when mice were fed these SCFAS directly, even in absence of prebiotic fiber in the diet, their blood pressure lowered and their cardiovascular health improved.

"One of the most unique findings of the study is that the bacterial profile of the gut, called the [gut microbiome](#), is closely associated with blood pressure and this link is the result of chemicals released by gut bacteria into the circulation," Professor Kaye said.

"The findings reinforce the need for a [diet](#) high in fiber and also point to new potential targets for the prevention and treatment of [cardiovascular disease](#)," Dr. Marques said.

Dr. Marques is currently leading a clinical trial funded by the National Heart Foundation to determine if a modified prebiotic fiber supplement, which produces high levels of beneficial gut metabolites as a result of microbial fermentation, could be used as a new strategy to lower blood pressure.

More information: Deficiency of Prebiotic Fibre and Insufficient Signalling Through Gut Metabolite Sensing Receptors Leads to Cardiovascular Disease. *Circulation*, www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.119.043081

Provided by Monash University

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