

Investigating the role a high-fiber diet can play in controlling high blood pressure

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One hundred million micro-organisms live within our gut, influencing our metabolism, our immune system and possibly even our mental health.

Molecular biologist and geneticist Dr. Francine Marques has a particular interest in whether gut bacteria also affects hypertension—or high [blood pressure](#). She's now conducting [clinical trials](#) to see if a high-fiber diet can bring blood pressure into a healthy range.

Her studies in mice have demonstrated that dietary fiber, particularly fiber that's prebiotic, "is able to prevent the development of high blood pressure."

Prebiotic fiber resists digestion until it reaches the [large intestine](#), where it feeds those bacteria "that are considered to have [health benefits](#)," Dr. Marques explains.

Microbial fermentation in the gut releases metabolites, small molecules called short-chain fatty acids. Her research shows that when mice are fed these short-chain fatty acids directly, their blood pressure lowers and their cardiovascular health improves.

The trial is testing whether humans will respond in the same way.

"We're giving people a diet that is high in fiber," she says. "But the food also contains this fiber that is fully enriched with these metabolites." The participants will also be given a placebo, "because that's the gold standard design for clinical trials."

Twice a day for three weeks, all participants will be given food including muffins, frittatas and arancini balls, all developed by a research chef. The meals have been tested to eliminate any difference in taste between those meals that are metabolite-enriched and those that are not.

"If the results are positive in the trial, we can try to reduce high blood pressure in more natural ways."

The food has been prepared in Monash University kitchens by research chefs and volunteers. Dr. Marques says the decision was made to add the metabolites to food—rather than asking participants to swallow a powder, say, in the hope that it would encourage compliance. Twelve men and women with untreated high blood pressure are already taking part in a three-week trial. She hopes to enlist 30 altogether.

"We tried everything to make sure that the food was good, and tasty, with a nice texture," she says. "The research chef did a fantastic job."

The preliminary study is possible because of funding from the Heart Foundation. If the results are good, she hopes a larger trial will take place.

"We know from [epidemiological studies](#) and also large meta-analysis that puts together lots of small clinical [trials](#), that intake of fiber is usually associated with lower blood pressure," she says.

In 2017, Dr. Marques published a study showing that the types of fiber in the gut, and their interaction with its microbes, was the likely cause.

"If the results are positive in the trial, we can try to reduce high blood pressure in more natural ways," she says.

The trial is for people aged 18 to 70, who have a body mass index lower than 30. It excludes people with gut-specific diseases such as [irritable bowel syndrome](#) or coeliac disease, and also vegetarians, because meat is included in the meals provided.

Participants are "tricky to find, because either people don't know that they have high blood pressure, or they're taking medication," she says. Some of the volunteers are keen to avoid medication, which can have side effects.

About a third of Australians older than 18 have high blood pressure, with the incidence increasing with age. Of these, more than two-thirds don't take medication. One reason is because they don't know they have the condition, which, in most cases, has no symptoms—it's known as the silent killer.

An added complication is that diagnosis can be difficult—up to a quarter of patients have "white-coat syndrome," in which their [blood](#) pressure reading shoots up in a doctor's office, but settles in a more familiar environment. And a further 20 percent experience the opposite. They have "masked hypertension," in which their reading is artificially low in a clinical setting.

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.

Dr. Marques says her approach to research changed after she was diagnosed with stage three ovarian cancer—she's been in remission for four years.

"I'm a molecular geneticist, so my research was very much in the lab," she says. "Cancer changed the way that I saw life in general. I wanted my research to have a much more practical application, to help people more directly."

"These days I spend a lot of time mentoring people, and talking to people about the importance of science ... I hope I won't have cancer again, but I can't guarantee that. So if I have a legacy to leave, this would be my legacy."

Provided by Monash University

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