

Preeclampsia risk may be reduced by a healthy high-fibre diet

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Pregnancy outcomes and infant immunity have been linked to gut bacteria
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A healthy diet rich in fibre is generally recommended, but new research shows it could be even more important during pregnancy to promote the

wellbeing of the mother and child.

Plant-based fibre is broken down in the gut by bacteria into factors that influence the [immune system](#).

Researchers from the University of Sydney's Charles Perkins Centre, the Barwon Infant Study from Deakin University, Monash University, James Cook University and the Australian National University collaborated to investigate the role of these metabolic products of gut bacteria during pregnancy.

Senior author of the study Professor Ralph Nanan said the simple recommendation to 'eat real food, mostly plants, and not too much' might be the most effective primary prevention strategy for some of the most serious conditions of our time.

"The mother's gut bacteria and diet appear to be crucial to promoting a healthy pregnancy," Professor Nanan, from the University of Sydney School of Medicine and Charles Perkins Centre, said.

Published today in *Nature Communications*, the study found that in humans, reduced levels of acetate, which is mainly produced by fibre fermentation in the gut, is associated with the common and serious pregnancy-related condition preeclampsia.

Preeclampsia occurs in up to 10 percent of pregnancies and is characterised by high blood pressure, protein in the urine and severe swelling in the mother. It also interferes with the child's immune development whilst in the womb, with some evidence suggesting a link to higher rates of allergies and autoimmune disease later in life.

The current study found that preeclampsia affected the development of an important fetal immune organ, the thymus, which sits just behind the

breastbone.

Fetuses in preeclamptic pregnancies were found to have a much smaller thymus than children from healthy pregnancies.

The cells the thymus normally generates, called T cells (thymus-derived cells) - specifically those associated with the prevention of allergies and autoimmune conditions such as diabetes—also remained lower in infants after preeclampsia, even four years after delivery.

The mechanisms of acetate on the developing fetal immune system were further examined in separate experiments involving mice that showed acetate was central in driving fetal thymus and T cell development.

Together, these results showed that promoting specific metabolic products of gut bacteria during pregnancy might be an effective way to maintain a healthy [pregnancy](#) and to prevent allergies and autoimmune conditions later in life.

They may also, in part, explain the rapid increase of allergies and autoimmune conditions as Western diets are increasingly dominated by highly processed foods, which are very low in fibre.

"More studies are urgently needed to understand how we can best target this system to reduce the growing burden of immune related diseases in the modern world," said co-author Peter Vuillermine, co-lead of the Barwon Infant Study, a major birth cohort study being conducted by the Child Health Research Unit at Barwon Health in collaboration with the Murdoch Children's Research Institute (MCRI) and Deakin University.

More information: *Nature Communications* (2019). [DOI: 10.1038/s41467-019-10703-1](https://doi.org/10.1038/s41467-019-10703-1)

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