

# Creating a new paradigm for understanding the individual effects of diet

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Researchers at the Australian National Phenome Centre at Murdoch University and partners at Imperial College London have made a major breakthrough in understanding how individuals can have different

reactions to the same diets.

For decades, nutritionists and scientists have been debating whether weight loss is down to sheer will power and healthiness of diet, or whether maintaining a healthy weight is down to your genes.

In an article released today in the *Nature Food* journal, researchers show that people react differently to being fed exactly the same diet over a four-day period and that their urine contains different patterns of chemicals suggesting that we each have a unique response to diet.

ANPC Director and Pro Vice Chancellor of Murdoch University's Health Futures Institute Professor Jeremy Nicholson said although everyone consumed the same amount of calories, some people "excreted" more calories in their urine than others.

"The interaction between our genes and environment is complex and understanding the relationship between our metabolic response to diet is key to the prevention of chronic conditions such as obesity, heart disease and diabetes," Professor Nicholson said.

As part of the research, a group of healthy individuals were given four different diets ranging from a [healthy diet](#), containing lots of fruit, vegetables and fiber, to the equivalent of a fast food diet and their metabolism was measured using molecular profiling technology.

"Some individuals were more responsive to diet than others, regardless of whether the diet was healthy or not," Professor Nicholson said. "The [metabolic pathways](#) that were activated after each diet were found to be different between people, with these differences relating to blood glucose levels. Several of the chemicals that changed in the urine were generated by the gut bacteria which is consistent with the fact that people have different gut bacteria and that these bacteria can use

different foods as fuel."

Premier's Fellow and Professor of Computational Medicine at Murdoch University Professor Elaine Holmes said understanding how the bacteria are impacted by diet at the individual level will help to develop new dietary strategies for maintaining health.

"Based on the [metabolic response](#) to the four different diets, we were able to create a model that can predict the healthiness of a person's diet," Professor Holmes said. "We tested the model in two different populations and compared the chemical profiles to dietary records. This model will provide a framework for developing precision nutrition programs aimed at healthy weight loss or maintenance."

Dr. Isabel Garcia-Perez from the Department of Metabolism, Digestion and Reproduction at Imperial College London said: "We are in the process of implementing this tool in our dietitian clinics to improve the nutritional management of patients and we believe that this personalized approach will make a real difference to patients."

Professor Gary Frost the Head of Nutrition Research at Imperial College said: "This is a real paradigm shift in personalized nutrition research—for the first time we have tools that can rapidly evaluate the diet-microbiome interactions that affect individual responses to complex diet patterns in the real world."

Professor Nicholson said given the global importance of both over and under-nutrition in driving chronic disease, any new method that helps to understand response to [diet](#) at the individual or population level could be a valuable healthcare tool.

"This research is in line with the recently announced WA sustainable health initiative that requires creation of new metrics for both population

health tools that are applicable to prevention of nutrition-related conditions such as [heart disease](#) and diabetes," Professor Nicholson said.

**More information:** Isabel Garcia-Perez et al. Dietary metabotype modelling predicts individual responses to dietary interventions, *Nature Food* (2020). [DOI: 10.1038/s43016-020-0092-z](https://doi.org/10.1038/s43016-020-0092-z)

Provided by Murdoch University

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