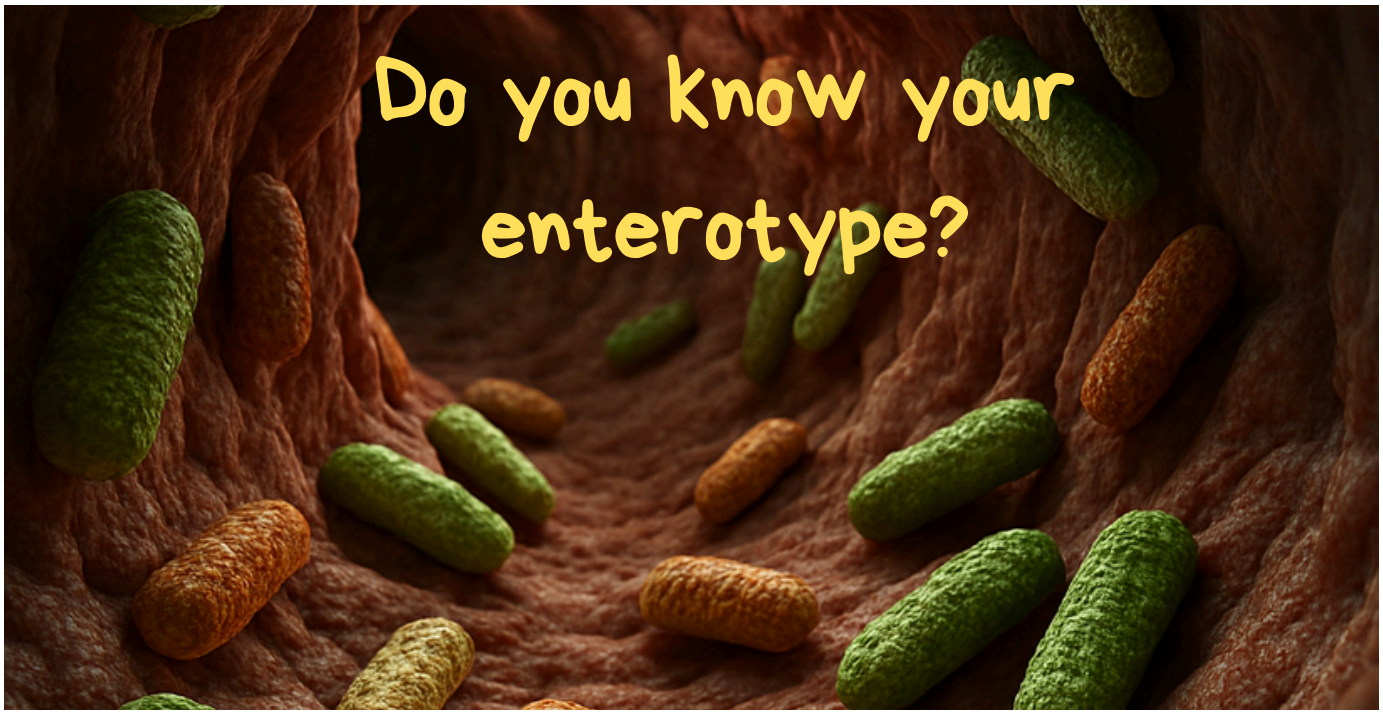


by Cliff Dominy PhD

Are you ruled by your brain, or your heart? A growing body of research suggests that it might be your gut. To be more specific, the director of your body's health may be your enterotype - the dominant bacteria living in your gut. Deep within your bowels, they control many of life's more basic processes through a communication mechanism known as the gut-brain axis. What is more, the messages they send to your brain can be influenced by the dietary fibre that you feed them.

These microscopic supervisors are back in the news thanks to a recent paper submitted to the *Journal of Nutrition* (1).

Researchers in Germany have shown that we respond differently to the type of fibre in our diet, depending on our enterotype. Their results offer a chance for health-minded individuals, who know their "type", to tweak their fiber intake to favour specific health outcomes.

You are what you eat.
The question is,
what should you eat?

Gut bacteria, the unsung heroes of our health

The human gut is a complex community of bacteria, viruses, yeast and fungi - in fact, your gut microbes outnumber the human cells in your body. This ecosystem, known as the gut microbiome, contains over 3,000 species across several bacterial families.

Microbiome science classifies humans into at least two common enterotypes, based on these bacteria.

1. *Bacteroides*-dominant (B-type): common in people who prefer meat-based diets
2. *Prevotella*-dominant (P-type): associated with a preference for plant-based diets

A rare third enterotype has recently been described, but did not form part of the study.

3. *Ruminococcus*-dominant (R-type): Recent discovery, not well understood.

Can you switch teams?

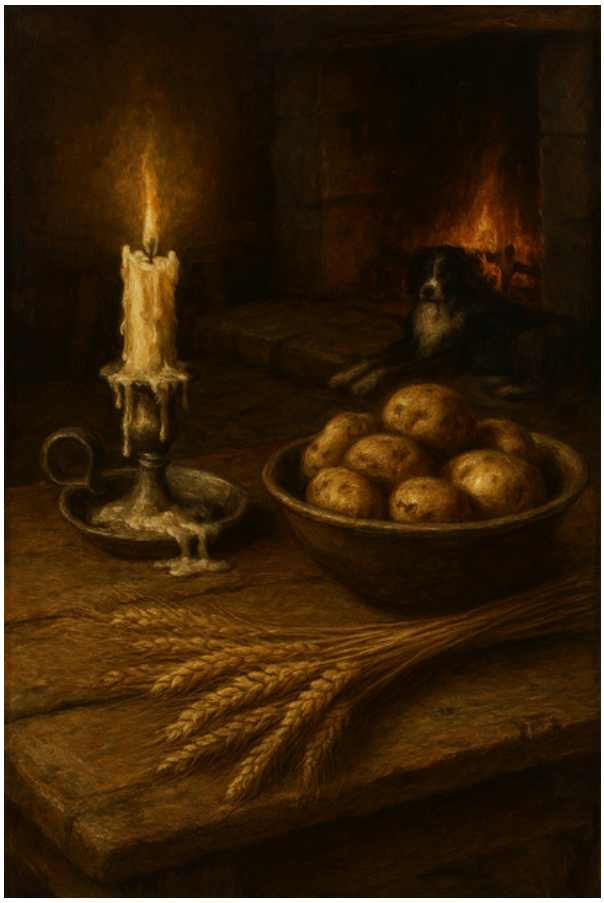
Yes, maybe. Your enterotype is largely fixed, but it is possible for people to nudge their microbial balance towards the other group by shifting the source of protein in their diet. For example, a B-type person seeking the benefits of a plant-based diet can increase the P-type bacteria in their gut simply by eating more plants.

Let us dive into the weeds

The team led by Madeline Bartsch at Leibniz University enrolled 23 healthy adults in a dietary supplement trial. Participants were grouped by enterotype: B-type or P-type. Each volunteer completed three two-week interventions with a fibre supplement, in random order, separated by washout periods. The team chose two very different fibres for the study, arabinoxylan and inulin, because of their differing benefits to human health.

- Arabinoxylan is a large, highly branched molecule made of xylan and arabinose, found in cereals and grains.
- Inulin is a smaller, linear molecule made of fructose and glucose, found in roots and tubers.
- Placebo: no fibre at all.

The volunteers provided routine blood, breath and stool samples during the trial, which allowed the team to compare blood markers and bacterial diversity for each group after exposure to a particular fibre.



Your enterotype matters

Both dietary fibres produced beneficial changes for B-type and P-type enterotypes. Both groups showed increases in healthy short-chain fatty acids and decreases in branched-chain fatty acids for each fibre source. Short-chain fatty acids are crucial for gut barrier integrity and metabolic health. Branched-chain fatty acids offer some anti-inflammatory benefits but are otherwise less useful to humans.

Does this mean that a meat-eater should avoid inulin-rich fries with his steak? Research, as they say, is ongoing. Spouses of B-types should be aware that increased hydrogen gas production was observed too.

P-type enterotypes reported feeling more full when on arabinoxylan compared to inulin. They reported increased satiety more often than the B-type participants, which could be a useful strategy for those wishing to lose

Enterotype	B-type		P-type	
Fibre source	AX	INU	AX	INU
Short-chain fatty acids	up		up	
Branched-chain fatty acids	variable	down		down
Hydrogen gas	up	variable		
Variability	up			
Bacterial diversity		up	down	down
Satiety			up	
Blood sugar		up		
LDL-cholesterol		up		

These results were not unexpected. Of interest was how the enterotype response differed from each other. B-type humans enjoyed greater bacterial diversity on inulin, but showed an increase in markers of diabetes and cardiovascular disease- an unwelcome observation.

weight. The downside, bacterial diversity was lower with either fibre. The reason for this is not quite clear. Perhaps P-type people do not need the diversity of bacteria in their guts because of their plant-based food choices. The good news, markers of diabetes and heart disease were unaffected by the two fibres.

The results suggest that identifying your enterotype could be a helpful first step before starting any physician-approved lifestyle change, whether for weight loss, blood-sugar control or some other purpose.

The way forward

This was a proof-of-concept study, which showed that the gut microbiome controls how we metabolize fibre, yielding measurable changes in just a few weeks. The authors acknowledged some limitations of the study that could have influenced the results. For example, it is difficult to extrapolate long-term health consequences from a short-term study with limited participants. Given the small sample size, they could not rule out the effect of environmental or socioeconomic factors on their results.

Future work will expand on this concept involving people from more diverse backgrounds to get a better idea of the generalizability of the concept. The range of fibre tested will be expanded, and more clinical markers deployed to better understand our bodies' response to fibre. Crucially, longer-term studies will allow the team to measure health outcomes for the two groups.

Reference

Bartsch A, et al. *Microbiota-dependent fiber responses: a proof-of-concept study on short-chain fatty acid production in Prevotella- and Bacteroides-dominated healthy individuals*. *J Nutr.* Published online 2025.

The ultimate goal? A personalized nutritional roadmap based on your enterotype.

What is on your plate?

Until science catches up with the complexity of your gut, the best bet is for most people to include a variety of fibre in their diet. Nutritional observation suggests that there are increasing health benefits from increasing your fibre intake. There is no upper limit - apart from one's personal tolerance.

The take-home message, no matter what your enterotype - B-type, P-type, or somewhere in between, tucking into the shrubbery in all its diversity, remains a good idea.