

SUPPLEMENTARY DISCUSSION

Response of *Prevotella* to increased fiber consumption

Bacteria from the genus *Prevotella* did not show a detectable increase on the plant-based diet. The enteric abundance of this genus is one of the leading sources of interindividual gut microbiota variation⁵⁷, and cross-sectional surveys of developing world microbiota have associated *Prevotella* levels with fiber intake^{58,59}. Targeted diet studies have so far been unable to show that these microbes respond on short time-scales to fiber supplementation, which has motivated the hypothesis that these bacteria respond to long-term fiber intake. Our experiment is consistent with this model of long-term diet sensitivity, showing that *Prevotella* levels are significantly correlated with daily fiber intake on long timescales ($p=0.008$, Spearman correlation; **Extended Data Fig. 4**). However, our DHQ analysis also reveals equal and stronger correlations between *Prevotella* abundance and dietary vitamins A and B₅ (**Supplementary Table 10**), suggesting an alternative hypothesis that micronutrients may influence the growth of *Prevotella* in the human gut.

The vegetarian gut microbiota and its response to an animal-based diet

Further clues to the diet factors regulating enteric *Prevotella* abundance may be found in the vegetarian subject's response to the animal-based diet (Subject 6). This subject had the highest fiber and carbohydrate intake, as well as the lowest %kcal from fat, of all the subjects during the study baseline period (**Supplementary Table 4**). The vegetarian subject's baseline microbiota was also dominated by *Prevotella* but lacked appreciable *Bacteroides* populations; this relative abundance was switched among the omnivores, who had large *Bacteroides* populations, but minor *Prevotella* ones (**Extended Data Fig. 2a,b**). Thus, the vegetarian's baseline gut microbiota was distinct from the other subjects' when projected onto a 2-dimensional space (**Extended Data Fig. 2c**). Remarkably, the animal-based diet inverted the vegetarian's *Prevotella* to *Bacteroides* ratio, causing the *Bacteroides* to outnumber the *Prevotella* by day 4 of the diet. While on the animal-based diet, the vegetarian's fat intake also more than tripled relative to the baseline period. Together, these findings demonstrate the potential for short-term diet to reduce *Prevotella* in favor of *Bacteroides*; however, they reflect observations from a single subject and more in-depth studies of vegetarians will be needed to assess if a relationship exists between vegetarianism and *Prevotella* levels.

SUPPLEMENTARY REFERENCES

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