

Diet, obesity, and gut microbes: determinants of metabolic outcomes in non-human primates

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Abstract

The composition of the gut microbiome is affected by diet as well as obesity, which can itself be diet-related, but the comparative influences of these factors are unclear. To explore the complex interactions among diet, obesity, and gut microbes, researchers examined female monkeys fed either a Western or Mediterranean diet. Metagenomic sequencing of fecal samples revealed that diet was the main contributor to gut bacterial diversity. Compared with the Western diet group, the Mediterranean diet group had greater overall diversity and different abundance of 54 bacterial species. Within each diet group, leaner and heavier monkeys also had subtly different microbiomes. Interestingly, the Western diet-fed group had more *Prevotella copri* and had high-*P. copri* and low-*P. copri* subgroups. High-*P. copri* monkeys had lower diversity than low-*P. copri* monkeys and different proportions of some microbes. Untargeted metabolomics of urine and plasma also suggested that the high-*P. copri* monkeys exhibited early kidney dysfunction. Although additional studies with male subjects and baseline fecal samples are needed, this study suggests that diet is the main driver of gut microbiome diversity but interacts with body weight to affect some taxa and that *P. copri* may mediate metabolic dysfunction in Western diet-fed monkeys.