

Sociable chimps harbor richer gut microbiomes

January 15 2016



Two chimpanzees interact in Gombe National Park, Tanzania. Credit: Steffen Foerster, Duke University

Spending time in close contact with others often means risking catching germs and getting sick. But being sociable may also help transmit

beneficial microbes, finds a multi-institutional study of gut microbiomes in chimpanzees.

Researchers based at The University of Texas at Austin, Duke University, The University of California, Berkeley and other institutions monitored changes in the [gut microbes](#) and social behavior of [wild chimpanzees](#). Their research—linked to a population of chimpanzees studied over eight years in Gombe National Park, Tanzania—found that the number of bacteria species in each chimp's GI tract increases when the chimps are more gregarious.

The results help scientists better understand the factors that maintain a healthy [gut](#) microbiome.

The warm, soft folds of our intestines are home to hundreds of species of bacteria and other microbes that help break down food, synthesize vitamins, train the immune system and fight infections. Reduced gut microbial diversity in humans has been linked to obesity, diabetes, Crohn's and other diseases.

"The more diverse people's microbiomes are, the more resistant they seem to be to opportunistic infections," said Andrew Moeller, research fellow at the University of California, Berkeley, who co-authored the study published this week in the journal *Science Advances* with corresponding author Howard Ochman, a professor of integrative biology at The University of Texas at Austin, and a team from other institutions.



Two chimpanzees interact in Gombe National Park, Tanzania. Credit: Steffen Foerster, Duke University

The researchers analyzed the bacterial DNA in droppings collected from 40 chimpanzees between 2000 and 2008. The chimpanzees ranged in age from infants to seniors.

The researchers identified thousands of species of bacteria thriving in the animals' guts, many of which are also commonly found in humans, such as *Olsenella* and *Prevotella*.

The team then combined the microbial data with daily records of what the animals ate and how much time they spent with other chimps versus alone.

"Chimpanzees tend to spend more time together during the wet season when food is more abundant," said Duke University research scientist Steffen Foerster, who co-authored the study. "During the dry season they spend more time alone."

The researchers found that each chimpanzee carried roughly 20 to 25 percent more bacterial species during the abundant and social wet season than during the dry season.

But the microbiome differences weren't solely due to seasonal changes in the fruit, leaves and insects that make up their diet, the researchers found. The chimps' shifts between hobnobbing and loner lifestyles were also important.

Gut bacteria probably pass from chimp to chimp during grooming, mating or other forms of physical contact, or when they inadvertently step where other chimps have pooped, said co-author Anne Pusey, chair of Duke's department of evolutionary anthropology.

The mix of bacteria in the animals' bowels was just as similar between unrelated individuals as it was between mothers and offspring, the researchers found. This was surprising because infants pick up their first microbiomes from their mother when they pass through her birth canal. The findings suggest that, over a lifetime, social interactions with other chimps are just as important for gut microbial diversity as initial exposure from the mother.

Scientists don't yet know whether social networks help maintain gut microbiome diversity in humans. "One of the main reasons that we started studying the microbiomes of [chimpanzees](#) was that it allowed us to do studies that have not or cannot be done in humans," said Ochman. "It's really an amazing and previously underexploited resource."

Further studies are needed to determine how individual fluctuations in chimpanzee gut microbiome diversity impact their health, Moeller said.

More information: *Science Advances*,
[dx.doi.org/10.1126/sciadv.1500997](https://doi.org/10.1126/sciadv.1500997)

Provided by University of Texas at Austin

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