

Switching to hunter-gatherer lifestyle may increase diversity in children's gut microbes

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A Rutgers University-New Brunswick study followed a group of urban adults and children during a 16-day visit to this Venezuelan rainforest village, to see how their microbiome -- the good germs living on and in their bodies -- would change. Credit: Maria Gloria Dominguez-Bello, Rutgers University-New Brunswick.

An international team of researchers has shown that immersing city dwellers in the traditional lifestyle and diet of a rainforest village for two weeks increases the diversity of the visiting children's—but not the adults'—gut microbiota. In a small pilot study published this week in *mSphere*, an open-access journal of the American Society for Microbiology, the team shows that the immersion visit did little to shift the adults' skin, oral, nasal and fecal microbiota.

"We wanted to look at the question of whether

[microbiota](#) change during a drastic, radical change of diet and lifestyle," says Maria Gloria Dominguez-Bello, a microbial ecologist at Rutgers University in New Brunswick, New Jersey who led the study with microbiologist Monica Contreras from the Venezuelan Institute of Scientific Research. "In this village, there was no market economy, no bodega, no Coca-Cola—so this represented a radical shift in diet from a high percentage of processed foods in urban places to zero processed foods and an all-natural diet."

Dominguez-Bello, along with researchers from New York University and two Venezuelan institutes, took advantage of a visit planned by five, city-dwelling adult visitors—and two of their children—to live among an indigenous Yekwana village in the Bolivar State of Venezuela for 16 days. The village has a hunter-gatherer-gardener lifestyle and diet.

Typical fare includes cassava (a starchy, high-fiber tuber), corn, various wild fruits, including plantains, pineapples, and berries, fish, and small amounts of game meat and eggs gathered from wild birds. Visitors had two meals a day that consisted of soup with a bit of fish or meat. The rest of their diet consisted of "all-day snacking on cassava with fruit" says Dominguez-Bello. The visitors also bathed in the river without soap and followed the natural circadian rhythms of their hosts.

"The diet contains very little animal protein and it's very, very high in fiber and very low in fat," compared to Western diets, says Dominguez-Bello.

While it is known that people with traditional diets have higher gut microbiota [diversity](#) compared to those with urban diets, it was unknown if urban dwellers could shift the diversity of their microbiota higher simply by following a traditional lifestyle and diet. In the gut, a high diversity of microbes is considered a sign of good health.

Traditional people eat diets rich in unprocessed

plant material, which are much more chemically complex compared to processed foods. The smorgasbord of chemicals acts as fuel for a higher variety of microbes. Traditional people use less antimicrobial medicines and compounds in daily life, which might also contribute to their increased gut microbe diversity.

During the 16-day visit, the researchers collected samples from the visitors' skin, mouth, nose, and from a fecal swab. Age-matched samples were also collected from villagers. The samples were sequenced and compared.

Surprisingly, none of the adult visitors' microbiota shifted significantly during the visit, while the two children's gut microbiota trended toward a higher number of total microbial species present. Although these results were not statistically significant and in just two subjects, the researchers saw this as interesting nonetheless, given the children's ages of 4 and 7.

Up to now, it was thought that children's gut microbiota become stable and more 'adult-like' by the time they reach 3 years of age. "This indicates that the window for maturing your microbiome may not be 3 years of age, but longer," says Dominguez-Bello. Her team plans to do a larger study with 12 children participating in an "immersion summer camp" to a traditional village.

Because the children's [gut microbiota](#) exhibited more plasticity, these results raise an interesting possibility that urban children who eat a more traditional, high-fiber, low-fat and low-processed diet early in life might cultivate a more diverse set of [gut microbes](#). Conversely, adults may have a limited response due to their low microbiome plasticity.

Dominguez-Bello was not terribly surprised that the adults' gut and other microbiota changed so little: "If you take traditional people and bring them to New York, give them antibiotics and McDonald's to eat everyday, it's not surprising that they lose diversity," she says. "But if, as an urban dweller, you've already lost that gut microbe diversity and you move to a high-diversity [diet](#), maybe you cannot 'bloom' diversity because you simply don't have

those microbes present anymore."

More information: Kelly V. Ruggles et al, Changes in the Gut Microbiota of Urban Subjects during an Immersion in the Traditional Diet and Lifestyle of a Rainforest Village, *mSphere* (2018). DOI: 10.1128/mSphere.00193-18 , [dx.doi.org/10.1128/mSphere.00193-18](https://doi.org/10.1128/mSphere.00193-18)

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