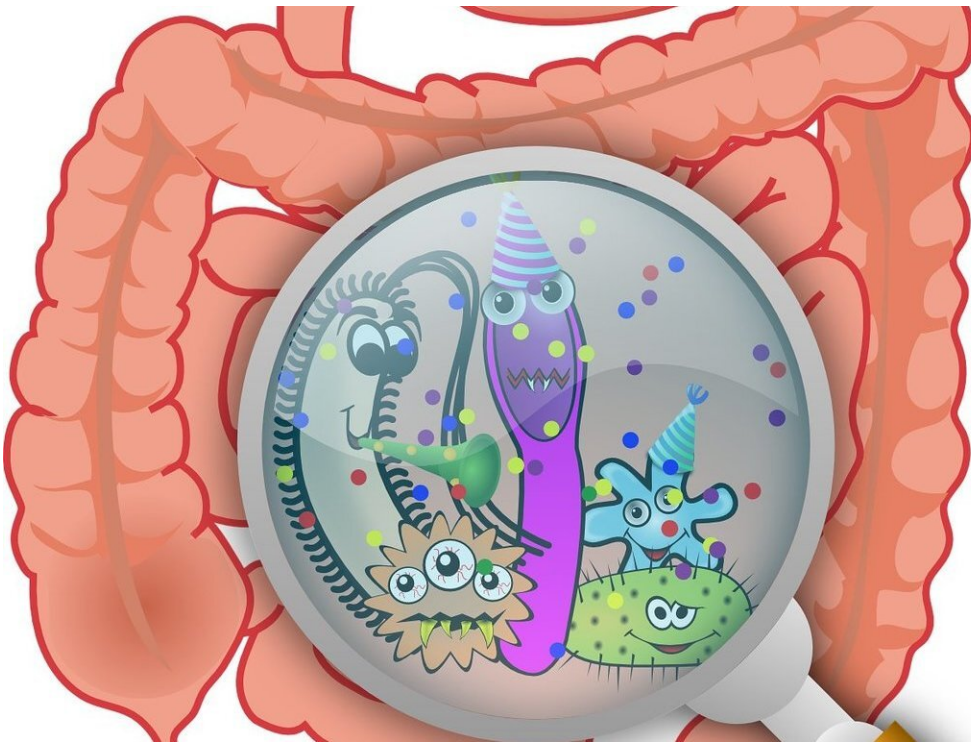


# The composition of gut bacteria almost recovers after antibiotics

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The use of antibiotics has long been linked to deprivation of gut bacteria. Now, a new study from University of Copenhagen shows that the composition and function of gut bacteria can recover after antibiotic treatment in healthy people. But after six months, the gut still lacks nine common beneficial bacterial species.

The trillions of [bacteria](#) in the [human gut](#) affect our health in multiple ways including effects on immune functions and metabolism. A rich and diverse gut microbiota is believed to promote health, providing the human host with many advantages to prevent chronic diseases. In contrast, poor diversity of the gut ecosystem is a characteristic feature of chronic diseases, including obesity, diabetes, asthma and gut inflammatory disorders.

Due to the general bacterial-killing nature of [antibiotics](#), it has been speculated that repetitive use of antibiotics deprives people of a rich gut bacterial environment, leading to adverse health effects. Now, an international team of researchers led from the University of Copenhagen and Steno Diabetes Center Copenhagen report when three antibiotics were given to young healthy men for four days, it caused an almost complete eradication of [gut bacteria](#) followed by a gradual recovery of most bacterial species over a period of six months.

After the six months, however, the study participants were still missing nine of their common beneficial bacteria, and a few new potentially undesirable bacteria had colonized the gut. The findings are published today in *Nature Microbiology*.

"We show that the gut bacterial community of healthy adults is resilient and able to recover after short-term simultaneous exposure to three different antibiotics. However, our findings also suggest that exposure to broad-spectrum antibiotics may dilute the diversity of the intestinal bacterial ecosystem. Antibiotics can be a blessing for preserving human health, but should only be used based upon clear evidence for a bacterial cause of infection," explains study leader Professor Oluf Pedersen, Novo Nordisk Foundation Center for Basic Metabolic Research.

The study was a four-day intervention with three broad-spectrum "last-resort" antibiotics in 12 adult healthy men. The cocktail of three

antibiotics was designed to mimic actual treatments in intensive care units. The gut is a reservoir of hundreds of [bacterial species](#) with antibiotic-resistant genes. This was confirmed in the study as these bacterial genes were the initiating force that led to the replenishment of bacteria in the gut.

"In this case, it is good that we can regenerate our gut microbiota which is important for our general health. The concern, however, relates to the potentially permanent loss of beneficial bacteria after multiple exposures to antibiotics during our lifetime. There is evidence that Western populations have a considerably lower diversity of their [gut microbiota](#) than native people living in certain parts of Africa and Amazonas. One possible explanation for this may be the widespread use of antibiotics in treatment of infectious diseases," says Oluf Pedersen.

**More information:** Albert Palleja et al, Recovery of gut microbiota of healthy adults following antibiotic exposure, *Nature Microbiology* (2018). [DOI: 10.1038/s41564-018-0257-9](https://doi.org/10.1038/s41564-018-0257-9)

Provided by University of Copenhagen

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