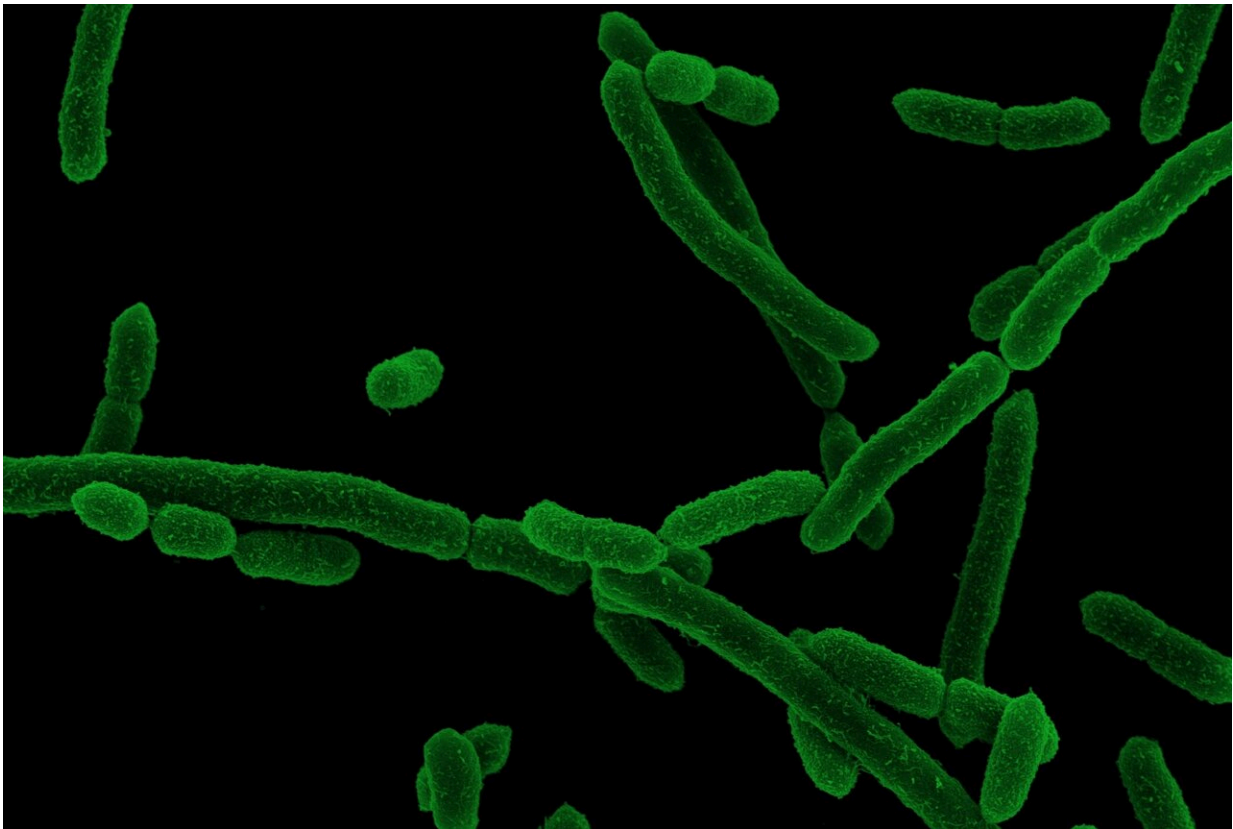


# Biodiversity of gut bacteria is associated with sexual behavior

February 26 2024, by Andreas Fischer

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Electron micrograph of *Segatella copri* (strain HDD04). Credit: HZI/Mathias Muesken

The human body is colonized by a variety of different microorganisms such as bacteria, yeasts and fungi. All these microbial co-

inhabitants—known as the microbiome or microbiota—are important for our health: For example, the microbiome in the gut supports digestion and helps to make nutrients available.

Although certain groups of bacteria dominate the [human gut microbiome](#), the exact composition varies from person to person. For example, bacteria from the Prevotellaceae family and the associated genus *Segatella* are very common, but not much is known about their biology as they are difficult to isolate and cultivate.

They are part of the original microbiome and are found in around 90 percent of people living in non-industrialized regions around the world, such as the Amazon or parts of Africa. In contrast, only 20 to 30 percent of people in Europe and the U.S. carry these bacteria.

A research team led by Prof. Till Strowig, who heads the "Microbial Immune Regulation" department at the Helmholtz Centre for Infection Research (HZI) in Braunschweig, recently succeeded in isolating additional representatives of the *Segatella* bacterial members.

"With high-resolution and high-throughput genomic analyses, we were able to show that the *Segatella* group, along with the well-known representative *Segatella copri* (previously known as *Prevotella copri*), is a much larger complex than it was previously known, with five species which were never described before," says Strowig.

With joint efforts from the Leibniz Institute DSMZ-German Collection of Microorganisms and Cell Cultures GmbH and the University of Trento (Italy), the research team has comprehensively characterized these species regarding their [genomic diversity](#), biological features, and links with human health.

"*Segatella* are specialized in the degradation of dietary fibers. However,

it is still not known whether or how they benefit our health," says Strowig.

The fact that they occur much less frequently in the microbiome of people living in the Westernized world is probably a result of the hygienic conditions: "Due to their extreme specialization in humans, these bacteria are mainly acquired through interpersonal contact, not through food, and intensive hygiene measures can break such natural colonization chains."

Together with Prof. Nicola Segata's team from the University of Trento, the scientists used meta-analyses to build associations between *Segatella* and certain diseases, but no associations were found. Instead, they found that *Segatella* is more common in males and is associated with a positive state of the cardiovascular system. The researchers [published](#) their findings in the journal *Cell Host & Microbe*.

In a follow-up study, the research team observed an elevated occurrence of *Segatella* in German men who had sex with men. They used both microbiome data and information collected by questionnaire from the study participants, who were recruited at the University Hospital Essen under the direction of Dr. Jan Kehrman.

*Segatella* were particularly common in the gut microbiome of men who had sex with men, and their presence was also associated with sexual behaviors.

"Around 70 percent of men who practiced sex with men carried multiple *Segatella* species in their gut microbiome, whereas this only occurs in around ten percent of the total Western population. These men thus had a microbiome that is very similar to that of people in non-industrialized regions and differs significantly from the average microbiome of industrialized societies," says Kehrman, a physician-scientist at the

Faculty of Medicine of the University of Duisburg-Essen.

The results have now been [published](#) in *Cell Reports Medicine*.

The analysis of the data on sexual behaviors revealed that a higher *Segatella* diversity was mainly driven by frequent partner changes. Interestingly, unprotected anal intercourse and oral sex were also significant factors, yet with a less remarked influence. The analyzed data was collected as part of an HIV study consisting of HIV-positive and HIV-negative men. Subjects of both groups were divided into men who practiced sex with men and those who did not. An influence of the HIV infection on the diversity of *Segatella* species in the intestine could not be observed.

"We speculate that the influence of sexual behaviors in the human gut microbiome might not be specific only to men who have sex with men. Therefore, we planned further studies on the microbiome in different sexual behaviors in populations including all genders," says Till Strowig.

In many diseases, such as inflammatory bowel disease, the microbiome has a reduced diversity of species, which is why a more diverse microbiome is seen as positive for health. "Mechanistically, the connection between microbial diversity in the gut and a positive effect on health is not yet understood," says Strowig. "However, our study results to date show that there are various transmission pathways for gut-associated *Segatella* species that influence the diversity of the microbial world."

**More information:** Aitor Blanco-Míguez et al, Extension of the *Segatella copri* complex to 13 species with distinct large extrachromosomal elements and associations with host conditions, *Cell Host & Microbe* (2023). [DOI: 10.1016/j.chom.2023.09.013](https://doi.org/10.1016/j.chom.2023.09.013)

Kun D. Huang et al, Establishment of a non-Westernized gut microbiota in men who have sex with men is associated with sexual practices, *Cell Reports Medicine* (2024). [DOI: 10.1016/j.xcrm.2024.101426](https://doi.org/10.1016/j.xcrm.2024.101426)

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