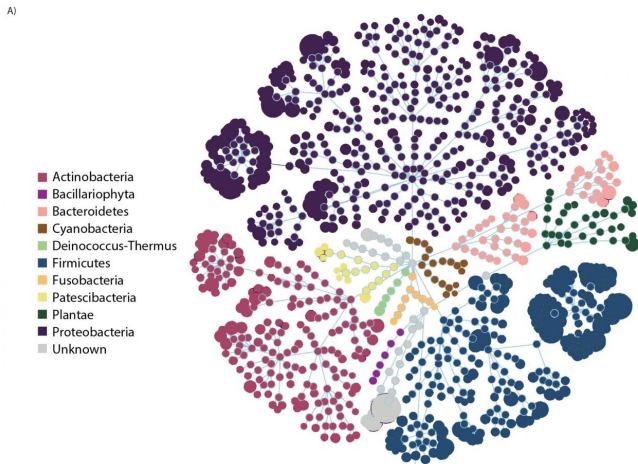


'Good bacteria' in breast milk changes over time

23 February 2021



Flower diagram representing the major bacterial groups (phyla) within the milk microbiome of Mam-Mayan Guatemalan mothers Credit: Emmanuel Gonzalez et al.

The cocktail of beneficial bacteria passed from mother to infant through breast milk changes significantly over time and could act like a daily booster shot for infant immunity and metabolism. The research, conducted by scientists from Montreal and Guatemala and published in *Frontiers in Microbiology*, has important implications for infant development and health.

Researchers discovered a range of microbiome species never before identified in human [milk](#). Until now, relatively little was known about the role microbiome bacteria play in [breast milk](#). These bacteria are thought to protect the infant gastrointestinal tract and improve aspects of long-term health, such as allergy prevention.

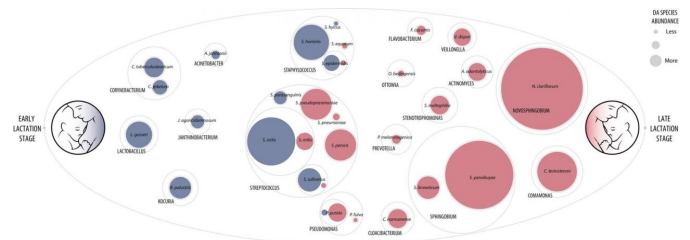
"Some [bacterial species](#) we observed in our sample breast milk had a common function in destroying foreign substances or xenobiotics and could play a role in protection against toxins and pollutants," says co-author Emmanuel Gonzalez, a

bioinformatics specialist at McGill University. The discovery sheds light on how [mothers](#) help lay the foundation for infant immunity.

Differences between early and late lactation

To learn more about the human milk microbiome, the scientists analyzed breast milk samples using high-resolution imaging technology, originally pioneered by McGill University and the University of Montreal to detect bacteria on the International Space Station.

They analyzed breast milk samples of Mam-Mayan mothers living in eight remote rural communities in the Western Highlands of Guatemala. This gave them a unique window to observe the human milk microbiome over time, specifically between early and late lactation (6-46 days versus 109-184 days).



An illustration of the bacterial species which change in the milk microbiome between early (6-46 days) and late (109-184 days) lactation. Credit: Emmanuel Gonzalez et al.

Unlike most mothers in North America, nearly all Mam-Mayan mothers breastfed for the World Health Organization's recommended period of six months. In North America, only 26% of mothers do so. "This longer feeding time allowed us to observe important changes in the bacteria provided to infants over time, which could impact long-term

health," says Gonzalez.

The genomic technology used by the scientists revealed a range of microbiome species shared among Mam-Mayan mothers, providing a glimpse of a diverse community of bacteria being passed on to infants.

"Studying microbiomes of diverse communities is important in order to understand the variation present in humans," says co-author Kristine Koski, an Associate Professor in the School of Human Nutrition at McGill. "Most human milk microbiome studies have been conducted with mothers from [high income countries](#), generating an incomplete picture of the important bacteria passed to infants during early development."

Working alongside underrepresented communities will be essential in getting an accurate picture of the [human milk](#) microbiome and the factors that shape it, according to the scientists. They hope that these discoveries will help encourage more inclusive and more robust research.

More information: Emmanuel Gonzalez et al, Distinct Changes Occur in the Human Breast Milk Microbiome Between Early and Established Lactation in Breastfeeding Guatemalan Mothers, *Frontiers in Microbiology* (2021). [DOI: 10.3389/fmicb.2021.557180](#)

Provided by McGill University

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