

The Female Gut Microbiota



Research highlighting the importance of gender differences in epidemiology, pathophysiology, and treatment of various health conditions is emerging year on year. However, there is still a reported discrepancy in the presentation of genders in health studies, including research into the female gut microbiota¹. Read on to discover how the composition of the female gut microbiota changes throughout the life course.

Pregnancy



Mode of delivery



The maternal gut microbiota shapes the neonatal gut microbiota, via direct transfer of bacteria.² This process plays a vital role in infant development, and can contribute to the neurodevelopment of the infant with potentially long-term and multi-generational outcomes².

Babies born by vaginal delivery are exposed to diverse maternal microbes³ and have been shown to have increased bifidobacteria. This is associated with a lower risk of childhood infections, atopic disorders, and obesity.^{4,5}

Adolescence/Adulthood



Childhood



The gut microbiota composition is determined by modifiable diet and lifestyle factors. Too little exercise, disrupted sleep, heightened stress levels and a lack of plant diversity and fibre in the diet can all negatively impact the gut microbiota composition.⁶⁻⁹

Greater numbers of *Bifidobacterium* and *Bacteroides*, and lower numbers of *Streptococcus* and *Enterococcus* are seen in breastfed babies compared to those consuming formula milk.¹⁰ Additionally, excessive antibiotic usage and/or increased hygiene measures are associated with a reduction in gut microbiota diversity during childhood.^{11,12}



Fertility

Menopause



Recent research has shown a correlation between alterations in gut microbiota composition and infertility^{13,14}. Causal relationships between the gut microbiota and female infertility are now being identified¹⁵, however, sufficient evidence to support this causal relationship is still needed.

The gut microbiota becomes less diverse, reflecting that of the male gut microbiota.¹⁶ Menopause is also associated with lower oestrobolome potential (see below).¹⁷

Older adulthood



Gut microbiota diversity generally declines with age.¹⁸

The Menstrual Cycle

The gut microbiota plays a role in regulating oestrogen levels. High levels of oestrogen and low levels of prostaglandins during the follicular phase can slow digestion and reduce bowel movements.¹⁹ In the luteal phase, high levels of prostaglandins can stimulate smooth muscles and increase the frequency of bowel movements.¹⁹

The Oestrobolome

The oestrobolome is a unique microbiome within your gut microbiome. It is made up of a collection of bacteria comprising of genes which are capable of metabolising and regulating circulating oestrogen levels.²⁰ Oestrogen levels can impact weight, libido and mood.²¹⁻²³

References



Authors: Charlotte Phillips and Dr. Emily Prpa, Yakult UK & Ireland
Reviewers: Dr. Nikoletta Vidra and Chiyuki Kajita, Yakult Europe

- [1] Siddiqui et al. (2022). *Biology*, 11(11), p.1683.
- [2] Mady et al. (2023). *Neurosci Biobehav Rev*, p.105195.
- [3] Korpela (2021). *Ann Nutr Metab*, 1–9.
- [4] Akay et al. (2014). *Anaerobe*, 28: 98–103.
- [5] Dogra et al. (2015). *MBio*, 6: e02419-14.
- [6] Madison et al. (2019). *Opin behav sci*, 28, pp.105-110.
- [7] Smith et al. (2019). *PLoS One*, 14(10), p.e0222394.
- [8] Clauss et al. (2021). *Front Nutr*, 8, p.637010.
- [9] McDonald et al. (2018). *mSystems*, 3(33): 10-128.
- [10] Ma et al. (2020). *Sci Rep*, 10(15792).
- [11] Francino (2016). *Front Microbiol*, 6(1543).
- [12] Korpela et al. (2016). *Nat Commun*, 7(1), p.10410.
- [13] Qi et al. (2021). *Gut Microbes*, 13(1), p.1894070.
- [14] Liang et al. (2023). *Front Endocrinol*, 14.
- [15] Li et al. (2023). *Sci Rep*, 13(1), p.11426.
- [16] Peters et al. (2022). *Int J Womens Health*, 14: 1059-1072.
- [17] Peters et al. (2022). *mSystems*, 7(3), pp.e00273-22.
- [18] Ragonnaud et al. (2021). *Immun Ageing*, 18(1): 2.
- [19] Chen et al. (2021). *Front Cell Infect*, 11, p.631972.
- [20] Baker et al. (2017). *Maturitas*, 103, pp.45-53.
- [21] Leventhal. (2000). *Perm J*, 4(3), p.29.
- [22] Payne. 2003. *Int Rev Psych*, 15(3), pp.280-290.
- [23] Davis et al. (2012). *Climacteric*, 15(5), pp.419-429.

About us

Yakult Science for Health is an educational hub for healthcare professionals to deepen their knowledge and understanding of the gut microbiota and probiotics.

Visit our Yakult Science Learning Hub for access to:



Resources and e-learning



Yakult Science events



Microbiome Matters
podcast with expert guests



Tailored workplace talks



Yakult Educational Grant



Research updates

Published March 2024

Find out more at yakult.co.uk/HCP

Contact us: science@yakult.co.uk

 [@yakultscience_ukie](https://www.instagram.com/yakultscience_ukie)

 [Yakult Science for HCPs in UK & Ireland](https://www.linkedin.com/company/yakult-science-for-hcps-in-uk-ireland)