

## Microbiome Colonization

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### Birth

There is a difference between the microbiome of a baby born vaginally compared to a baby born by c-section ([Azad, et al. 2013](#); [Penders et al. 2006](#); [Prince et al. 2014](#)).

During a vaginal birth the baby is colonised by maternal vaginal and faecal bacteria. Initial human bacterial colonies resemble the maternal vaginal microbiota – predominately Lactobacillus, Prevotella and Sneathia.

A baby born by c-section is colonised by the bacteria in the hospital environment and maternal skin – predominately Staphylococci and C difficile. They also have significantly lower levels of Bifidobacterium and lower bacterial diversity than vaginally born babies.

These differences in the microbiome ‘seeding’ may be the reason for the long-term increased risk of particular diseases for babies born by c-section.

The environment in which the baby is born also influences their initial colonisation. A study by [Penders et al. \(2006\)](#) found that term infants born vaginally at home and then breastfed exclusively had the most ‘beneficial’ gut microbiota. It is likely that these babies only came into contact with the microbiota of their family during the key period for ‘seeding’ the microbiome.

### Suggestions:

- A vaginal birth in the mother’s own environment is optimal for ‘seeding’ a healthy microbiome for the baby ([Penders et al. 2006](#)).
- Minimise physical contact by care providers on the mother’s vagina, perineum and the baby during birth.
- Avoid unnecessary antibiotics during labour. If antibiotics are required consider probiotics for mother and baby following birth.
- If the baby is born by c-section... Research is currently being undertaken into the use of vaginal swabs to ‘seed’ c-section babies. The preliminary results are that the microbiome of swabbed babies are more similar to vaginally born babies.

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The protocol the researchers are using is:

1. Place the baby 'skin-to-skin across the mother's chest immediately after birth if possible.
2. Take a piece of gauze soaked in sterile normal saline
3. Fold it up like a tampon with lots of surface area and insert into the mother's vagina
4. Leave for 1 hour, remove just prior to surgery and keep in a sterile container
5. Immediately after birth apply the swab to the baby's mouth, face, then the rest of the body
6. If a baby is born by c-section it is even more important to encourage and support their mother to breastfeed. It may also be worth considering additional probiotic intake.

### Postnatal

After birth, colonisation of the baby by microbiota continues through contact with the environment and breastfeeding. There are significant differences in the microbiota of breastfed babies compared to formula fed babies ([Azad, et al. 2013](#); [Guaraldi & Salvatori 2012](#)). Beneficial bacteria are directly transported to the baby's gut by breastmilk and the oligosaccharides in breastmilk support the growth of these bacteria. The difference in the gut microbiome of a formula fed baby may underpin the health risks associated with formula feeding. In the short term, [infant colic](#) may be associated with high levels of proteobacteria in the baby's gut.

Suggestions:

- Immediately following birth, and in the first days, baby should spend a lot of time naked on his/her mother's chest.
- Avoid bathing baby for at least 24 hours after birth, and then only use plain water for at least 4 weeks ([Tollin et al. 2005](#)).
- If in hospital, use your own linen from home for baby.
- Minimise the handling of baby by non-family members during the first weeks – particularly skin to skin contact.
- Exclusively breastfeed. If this is not possible consider probiotic support.
- Avoid giving baby unnecessary antibiotics ([Ajslev et al. 2011](#); [Penders et al. 2006](#)).  
Again, if antibiotics are required probiotics need to be considered.
- Probiotics may also be beneficial for babies suffering from colic.

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### Summary

The more we understand about the human microbiome the more it seems fundamental to our health. Pregnancy, birth and breastfeeding seed our microbiome and therefore have a long-term effect on health. More research is needed to explore how best to support healthy seeding and maintenance of the microbiome during this key period.

### Further reading and resources

Toni Harman and Alex Wakeford, *The Microbiome Effect - How Your Baby's Birth Affects Their Future Health*, Pinter and Martin, 2016

'Is society being shaped on a microbiological and epigenetic level by the way women give birth? – The Crickey Health blog

5 ways gut bacteria affect your health

**Link:** <http://www.livescience.com/39444-gut-bacteria-health.html>

Gut feelings: the future of psychiatry may be inside your stomach

**Link:** <http://www.theverge.com/2013/8/21/4595712/gut-feelings-the-future-of-psychiatry-may-be-inside-your-stomach>

Gut bacteria might guide the workings of your minds

**Link:** <http://www.npr.org/sections/health-shots/2013/11/18/244526773/gut-bacteria-might-guide-the-workings-of-our-minds>

### Further information

Toni Harman and Alex Wakeford, [Microbirth](#) – The Movie.