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Breastfeeding good for premature baby's gut

One out of 10 babies are born prematurely. Premature birth increases the risk of certain diseases and conditions, partly because the baby's intestines are not yet fully developed. PhD candidate Jannie Henderickx studied the differences in the gut bacteria and fungi between premature and full-term babies.

Approximately 15 million babies are born before the 37th week of pregnancy every year. This is called premature birth. Not much research has been done on nutrition and intestinal development in premature babies, and yet it is certainly an issue: 'The intestines are exposed to bacteria at an earlier stage than is normal,' says doctoral candidate Jannie Henderickx (Microbiology). Henderickx studied the differences in the gut and microbiota between babies born prematurely and those carried to term. 'The intestinal barrier, a protective layer between the intestine and the rest of our bodies, is still weak in premature children. This could cause a diminished resistance to disease.' That can contribute to sepsis (blood poisoning) and necrotising enterocolitis (the death of intestinal tissue), the most common diseases affecting premature babies.

The doctoral candidate studied the babies' faeces and stomach contents (drained through a feeding tube), looking for proteins and bacteria that are typical of the different developmental stages of the intestine. 'We saw that certain proteins, such as mucine-5AC, are less prevalent in premature babies.' These proteins may help form the protective layer in the digestive tract. Henderickx also saw that premature babies had fewer of the enzymes needed to break down breastmilk than did babies that were carried to term. As a result, they cannot benefit as much from breastfeeding.

Healthy chubbiness

The gut flora in premature and full-term babies differ significantly. Breastfeeding and the type of delivery (vaginal birth or caesarean section) affect the micro-

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biota too. 'A baby that has been carried to term, was delivered through the birth canal and is then breastfed is considered the gold standard in terms of microbiome,' Henderickx says. 'That microbiome is perfectly suited to processing breastmilk.'

Breastfeeding stimulates the development of the baby's immune system. Premature babies that are breastfed also have a higher level of *Bifidobacteria*, which are probably beneficial for the baby's intestine. '*Bifidobacteria* convert certain sugars from breastmilk into short-chain fatty acids, that serve as food for other beneficial bacteria that strengthen the intestinal wall.' Henderickx discovered that *Bifidobacteria* were related to a higher body weight, but were less prevalent in premature babies. A higher body weight in premature babies indicates good health.

Henderickx will graduate with a PhD for her research on 25 March. She will then start work at the Center for Microbiome Analyses and Therapeutics at Leiden University Medical Centre in Leiden. She hopes to remain involved in the planned follow-up research with Amsterdam UMC and Isala Children's Hospital in Zwolle. In this study, researchers aim to study the digestion of breastmilk by the digestive tract and confirm the assumed link between proteins, *Bifidobacteria* and intestinal health. ss