

Feeding C-section newborns their mother's poop may help build healthy microbiota: study

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Infants delivered by cesarean section have an increased risk of developing asthma and allergies as babies and toddlers, probably because they don't get exposed to the microbiota in the mother's vagina and perineum during birth, negatively impacting how their immune systems develop. While a few studies have looked at whether swabbing a newborn's skin with vaginal fluid immediately after birth reduces this risk, a paper published October 1 in the journal *Cell* offers a more drastic way to expose newborns to their mother's microbiota: by diluting a small amount of their mother's feces in breast milk and feeding it to them just after birth. The researchers report that the proof-of-concept procedure appears to be safe and at three months resulted in the

newborns having a microbial makeup that looks more similar to babies born vaginally than to those born by C-section.

"From a clinical point of view, this transfer of microbial material is happening during a vaginal delivery," says co-senior author Sture Andersson, of the Pediatric Research Center at the University of Helsinki and Helsinki University Hospital in Finland. "This is a gift the mother gives to her baby."

At birth, the immune system is undeveloped, but once a baby begins living in the outside world, their immune system matures in response to microbial exposure. Although every person's [microbiota](#) is individualized, the overall patterns of which bacteria types colonize the gut are different in babies born vaginally and those born by C-section. These variations appear to make a difference in how the [immune system](#) learns to respond to outside stimuli, including potential allergens.

The mothers who took part in the study were recruited with leaflets placed in doctors' waiting rooms. About 30 women contacted the researchers to learn more, and 17 agreed to participate. Ten of them were found to have contraindications, such as a recent course of antibiotics or a potentially dangerous microbe, and ultimately seven mothers who were scheduled to have C-sections were enrolled.

The babies were given the fecal microbiota transplants (FMTs) shortly after birth. The mothers' fecal samples were collected three weeks beforehand. The babies stayed in the hospital for two days after the transplant to make sure there were no complications. The babies' own fecal microbiota was tested at birth (the meconium) and again at two days, one week, two weeks, three weeks, and three months. The babies also had blood work done two days after [birth](#).

The investigators found that by three months of age, the microbiotas of

the babies who received the FMTs were similar to those of babies born vaginally. They were different from those of babies born by C-section, as well as from their mothers' microbiotas. As a baseline for these comparisons, the researchers used data collected previously at the same hospital, as well as global datasets.

"This was not designed as a safety study, but we found it to be effective and supporting the concept of vertical transfer from mother to baby," says co-senior author Willem de Vos, of the Human Microbiome Research Program at the University of Helsinki and the Laboratory of Microbiology at Wageningen University in the Netherlands. "However, it's very important to tell people that this is not something they should try on their own. The samples have to be tested for safety and suitability."

Andersson notes that despite how unpalatable this research may seem to most people, the mothers who agreed to participate in the study were very motivated. One woman who was having twins was told the FMT could be giving to one baby, with the other one used as a sort of control. She declined, stating that she didn't want one of her babies to have an unfair advantage by receiving the transplant.

In future work, the researchers plan to study the development of the immune systems in C-section [babies](#) who receive FMTs and compare it to those who don't. Unlike the current study, which was observational, the future studies will have a control group and will be blinded to the mothers.

More information: *Cell*, Korpela et al.: "Maternal Fecal Microbiota Transplantation in Cesarean-Born Infants Rapidly Restores Normal Gut Microbial Development: A Proof-of-Concept"

[www.cell.com/cell/fulltext/S0092-8674\(20\)31089-8](http://www.cell.com/cell/fulltext/S0092-8674(20)31089-8) , DOI: [10.1016/j.cell.2020.08.047](https://doi.org/10.1016/j.cell.2020.08.047)

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