

Research reveals new insight into why breastfed babies have improved immune systems

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Research led by the University of Birmingham and Birmingham Women's and Children's NHS Foundation Trust has revealed new insight into the biological mechanisms of the long-term positive health effects of breastfeeding in preventing disorders of the immune system in later life.

Breastfeeding is known to be associated with better health outcomes in infancy and throughout adulthood, and previous research has shown that babies receiving breastmilk are less likely to develop asthma, obesity, and autoimmune diseases later in life compared to those who are exclusively formula fed.

However, up until now, the immunological mechanisms responsible for these effects have been very poorly understood. In this new study, researchers have for the first time discovered that a specific type of immune [cells](#)—called regulatory T cells—expand in the first three weeks of life in breastfed human babies and are nearly twice as

abundant as in formula fed babies. These cells also control the baby's immune response against maternal cells transferred with breastmilk and help reduce inflammation.

Moreover, the research—supported by the National Institute for Health Research's Surgical Reconstruction and Microbiology Research Centre (NIHR SRMRC) - showed that specific bacteria, called *Veillonella* and *Gemella*, which support the function of regulatory T cells, are more abundant in the gut of breastfed babies.

The results of the study, published in *Allergy*, emphasize the importance of breastfeeding, say the researchers.

Senior author Gergely Toldi, researcher at the University of Birmingham and consultant neonatologist at Birmingham Women's and Children's NHS Foundation Trust, said: "The influence of the type of milk received on the development of the immune response has not previously been studied in the first few weeks of life.

"Prior to our research the outstanding importance and the early involvement of this specific cell type in breastfed babies was unknown.

"We hope this invaluable new insight will lead to an increase in rates of breastfeeding and will see more babies benefit from the advantages of receiving breastmilk.

"Furthermore, we hope for those babies who are formula fed, these results will contribute to optimizing the composition of formula milk in order to exploit these immunological mechanisms.

"We are very grateful for the mums and babies who

contributed to this special project."

The study is the culmination of a unique three-year research project analyzing data from 38 healthy mothers and their healthy babies. Small amounts of blood and stool samples were collected at birth at Birmingham Women's Hospital and then again later during home visits when the babies were three weeks old. Sixteen out of the 38 babies (42%) were exclusively breastfed for the duration of the study, while nine babies received mixed feeding, and 13 babies were exclusively formula-fed.

The researchers hope to now further study this biological mechanism in sick and pre-term newborn [babies](#) who have developed inflammatory complications.

The research was carried out by a team working across the University of Birmingham's Institutes of Immunology and Immunotherapy; Cancer and Genomic Studies; Microbiology and Infection; and Metabolism and Systems Research, as well as the Department of Neonatology at Birmingham Women's and Children's NHS Foundation Trust, and NIHR SRMRC based at University Hospitals Birmingham NHS Foundation Trust.

More information: HL Wood et al. Breastfeeding promotes early neonatal regulatory T cell expansion and immune tolerance of non-inherited maternal antigens. *Allergy*. First published: 12 January 2021 doi.org/10.1111/all.14736

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