# Study reveals important associations between gut microbiome and eczema in infancy

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A new study has revealed important associations between the gut microbiome and eczema in infancy and has established the basis for the potential prevention and treatment of eczema via modulation of the gut

microbiota. The study was published in *mSystems*.

"The problem of eczema is increasing, and our study shows it could be a result of unwanted changes in the gut bacterial content. The first year of life could be a critical period to restore the gut bacteria to a more desirable composition," said the study's principal investigator Paul Chan, MD, professor of microbiology at The Chinese University of Hong Kong, Hong Kong Special Administrative Region, China.

In the new study, Dr. Chan and colleagues invited pregnant women who were close to term to participate in the research. They collected their information on health, lifestyle, events during pregnancy and delivery. After delivery, the researchers visited the women and collected information on their babies' diet, health and medication. The researchers arranged follow-up clinics to check the babies' health conditions and any eczema problems.

The researchers characterized the development and determinants of the gut microbiome in a cohort of 112 term Chinese children by sequencing 713 stool samples collected at nine time points from birth to 3 years of age using 16S rRNA gene sequencing.

The researchers revealed alterations in the composition and alpha and beta diversity of the gut microbiota across the first three years of life. They identified mode of delivery, feeding mode and intrapartum antibiotics as the major determinants of the early-life gut microbiome, the effects of all of which persisted up to 12 months. Importantly, by conducting a nested case-control study, they showed that alterations in the infant gut microbiota precede the development of eczema.

Interestingly, they identified a depletion of Bacteroides and an enrichment of Clostridium sensu stricto 1 in the gut microbiome of infants with eczema at 1 year old. The same patterns were also observed

in C-section born infants within the same time frames, suggesting a role of the gut microbiota in previously reported associations between C-section and increased risk of eczema.

"Our study found that the gut bacterial content of babies changes drastically over the first three years of life," said Dr. Chan. "The mode of delivery and feeding, and the use of antibiotics around the time of delivery affects the gut bacterial content. We observed characteristic changes in the gut bacterial content before the babies present with eczema. Remarkably, those bacterial changes were also observed in babies delivered by C-section. Nevertheless, the link between C-section and eczema requires further studies to verify. Gut bacteria may play a role in preventing or treating eczema."

**More information:** Man Kit Cheung et al, Development of the early-life gut microbiome and associations with eczema in a prospective Chinese cohort, *mSystems* (2023). DOI: 10.1128/msystems.00521-23

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