

How a mother's diet affects baby's gut health

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The first published results of a new Australian human milk research collaboration have shed new light on the gut-boosting, life-saving potential of carbohydrates known as HMOs, vital components of breastmilk produced by mothers during lactation.

The University of the Sunshine Coast's MilkBANC (Breastmilk And Nutrition Research Collaborative) was established to investigate differences in breastmilk to help improve infant nutrition and [general health](#), including the survival rate of premature babies suffering intestinal disease.

An initial study of 101 lactating mothers on the Sunshine Coast found "significant associations" between nutrients in the mothers' diets and prebiotics known as HMOs (human milk oligosaccharides).

Dietitian Dr. Caren Biddulph, a new UniSC Ph.D. graduate who led the joint research published in the journal [Nutrients](#), said there was growing evidence that HMOs played multiple positive roles in protecting infant health, such as reduced allergies and gastrointestinal and infectious diseases.

She said HMOs also protected against necrotizing enterocolitis, a deadly disease that could affect the most vulnerable premature babies.

"We hope this research will help shape clinical guidance around [maternal nutrition](#) during lactation to enhance the composition of HMOs," Dr. Biddulph said.

"If a breastfeeding mother's diet can alter the components of milk that help structure the baby's gut microbiome, adjusting that diet can potentially influence the baby's lifelong metabolic health.

"This is particularly important for the one in 10 babies born prematurely in Australia. We aim to find ways to optimize the levels of HMOs in donor milk that is fed to some premature babies."

She said it was exciting to extend understanding of the amazing components of human milk.

While further research was needed, initial results from milk sampling indicated:

1. Any level of alcohol consumption was associated with decreased levels of certain HMOs;
2. Dietary folate (both natural folate and [folic acid](#)) was associated with the total HMO levels;
3. Negative impact of maternal antibiotic exposure during pregnancy and maternal history of medical conditions such as thyroid dysfunction and allergy;
4. No associations between HMO concentrations and maternal fat mass, fat-free mass, or associated body composition indices;
5. The prevailing influence of genetic variation in lactating mothers may overshadow any impact of nutritional and/or physiological status on HMO composition in mature milk.

"Regarding the folate finding, there may be some merit in ensuring adequate folate status in clinically deficient mothers, or, at the very least, encouraging plant-based and fortified foods rich in folate in the usual diet when breastfeeding," Dr. Biddulph said.

"Australian food databases list cereal products, vegetables, legumes, and fruit (in particular, fortified orange juices) as major dietary sources of folate."

Dr. Biddulph's research was supervised by UniSC's Dr. Jude Maher, Dr. Mark Holmes, Dr. Trong Tran and Dr. Anna Kuballa, as well as The University of Queensland's Dr. Peter Davies and Royal Brisbane and Women's Hospital neonatologist Dr. Pieter Koorts.

The MilkBANC, within the UniSC Center for Bioinnovation, uses state-of-the-art spectroscopy and spectrometry capabilities to characterize human [milk](#) components with therapeutic potential.

Its methods of dietary assessment include tools such as a Dual X-ray absorptiometry (DEXA) scanner for the assessment of maternal body composition.

Center for Bioinnovation Director, Professor Abigail Elizur, said that the MilkBANC's work was already well accepted by the scientific and [academic community](#) "and more importantly by breastfeeding mothers and clinicians working in the area."

More information: Caren Biddulph et al, Associations between Maternal Nutrition and the Concentrations of Human Milk Oligosaccharides in a Cohort of Healthy Australian Lactating Women, *Nutrients* (2023). [DOI: 10.3390/nu15092093](https://doi.org/10.3390/nu15092093)

Provided by University of the Sunshine Coast

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