Mom's genes influence health-boosting sugars in human milk

***CHILD provides new insights into an important ingredient of human breastmilk**: naturally occurring sugars known as human milk oligosaccharides, or HMOs.*

Published in *Nature Communications*, the study sheds light on the complex relationships among a mother's genetic makeup, the HMOs in her breastmilk, and her baby's respiratory health.

"We know that breastfeeding provides many amazing health benefits," says co-author Dr. **Meghan Azad**, a leading breastmilk researcher at the University of Manitoba, "but we don't fully understand how this works at the biological level."

GENES, SUGARS & ASTHMA RISK

The researchers conducted genome-wide association studies (GWASs), looking at millions of DNA sequence variations and how they relate to varying concentrations of 19 different HMOs in the milk of 980 CHILD mothers. They then looked at whether these differences in HMOs were associated with risk of developing recurrent wheeze, an early symptom of asthma, among the breast-fed babies.

A team led by Dr. **Qingling Duan**, a Queen's National Scholar in Bioinformatics at Queen's University, identified strongly correlated genetic variations among the moms and the HMO composition of their milk.

BLOWN AWAY

"My team was blown away by the significance of the GWAS signals between the maternal genomes and their HMO profiles," notes Dr. Duan.

Even for genes known to influence HMO composition, the study revealed more about their potential biological functions and impact on more than one HMO.

"For example, we knew that the FUT2 gene impacted the HMO profile of milk," observes co-author Dr. **Lars Bode** of the University of California San Diego. "However, this study shows us that FUT2 doesn't only affect HMOs with a chemical bond regulated by the FUT2 enzyme – it affects many others."

HEALTHCARE ADVANCES

Tracing the impact of HMOs on the babies' later respiratory health, the researchers found that milk with different HMO profiles appeared to affect childhood outcomes—sometimes even overriding the risk carried in the children's genes. Milk with high levels of specific HMOs tends to protect babies against later developing wheeze. This impact is particularly evident among children with high genetic risk of developing asthma.

By increasing our knowledge about how HMOs are produced and how they influence health, the study points to possible new advances in healthcare and medical research.

CHILD COHORT STUDY

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