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Faculty of Medicine

Mom and baby share “good bacteria” through breastmilk

WINNIPEG, MB (July 10, 2020)

A new study by researchers at the University of Manitoba and the University of British Columbia (UBC) has found that bacteria are shared and possibly transferred from a mother’s milk to her infant’s gut, and that breastfeeding directly at the breast best supports this process.

The research, [published today](#) in *Cell Host & Microbe*, found that certain bacteria, including *Streptococcus* and *Veillonella*, co-occur in mothers’ milk and their infants’ stool, and this co-occurrence is higher when infants nurse directly at the breast.

“Gut microbiota development in early life impacts long-term health and breastfeeding is among the most influential factors affecting this process,” said Dr. Meghan Azad, a Canada Research Chair in Developmental Origins of Chronic Disease at the University of Manitoba, and co-director of the Manitoba Interdisciplinary Lactation Centre (MILC) at the Children’s Hospital Research Institute of Manitoba.

“While pumped milk provides many important benefits, we suspect that the process of pumping, storing and bottle-feeding breastmilk may reduce the transfer of viable milk bacteria from mom to baby.”

The collaborative study was co-led by Dr. Stuart Turvey, a pediatric immunologist and investigator at BC Children’s Hospital, Aubrey J. Tingle professor of pediatric immunology, Canada Research Chair in Pediatric Precision Health and professor in the UBC department of pediatrics; and Dr. B. Brett Finlay, Peter Wall Distinguished Professor in the Michael Smith Laboratories and professor in the departments of biochemistry and molecular biology, and microbiology and immunology at UBC. Trainees Kelsey Fehr and Dr. Shirin Moossavi at the University of Manitoba, and Dr. Rozlyn Boutin and Dr. Hind Sbihi at UBC were the study’s co-first authors.

According to the researchers, this is the first study to evaluate the association of multiple breastmilk feeding practices (mode, exclusivity, and duration), milk bacteria, and milk components with infant gut microbiota composition at multiple time points in a baby’s first year.

“Our study confirms that breastmilk is a major driver of infant gut microbiota development,” said Dr. Turvey. “We found that breastfeeding exclusivity and duration was strongly associated with a baby’s overall gut microbiota composition and that breastmilk bacteria shape a baby’s gut microbiome to a similar degree as other known modifiers of the gut microbiota such as birth mode – meaning a cesarean-section or vaginal delivery.”

The 1,249 mother-baby pairs involved in the research are participating in the [CHILD Cohort Study](#) (CHILD), a world-leading birth cohort study in maternal, newborn and child health research. The findings build upon previous CHILD research that showed pumping breastmilk is associated with differences in both [milk microbiota composition](#) and [infant health](#).

“Uniquely, our study showed that while breastmilk and the infant gut have distinct microbiota compositions, there are a few commonly shared bacteria that were more prevalent and abundant in breastmilk of mothers who only nursed directly at the breast, while other bacteria showed dose-dependent associations with exclusive breastfeeding,” commented Dr. Finlay.

“These results advance the hypothesis that breastmilk may act as an incubator that enriches, protects and transports certain bacteria to a baby’s intestinal tract and this may give us clues about

which bacteria could make good probiotics since they appear to withstand the trip to the baby's gut."

"This is important new knowledge as the field moves toward improving recommendations on handling and storing human milk for 'real-world' scenarios where many moms need to pump, and understanding how microbes may be manipulated in the future to optimize health," said Dr. Azad.

About the CHILD Cohort Study: Launched in 2008 by CIHR and AllerGen NCE, the [CHILD Cohort Study \(CHILD\)](#) is tracking nearly 3,500 Canadian infants and their families to help determine the root causes of chronic diseases such as asthma, allergies and obesity. CHILD spans four provinces, involving more than 140 multidisciplinary researchers, students and research staff. [Watch the CHILD Cohort Study videos.](#)

About the Children's Hospital Research Institute of Manitoba: The Children's Hospital Research Institute of Manitoba was established in 2001. [CHRIM](#) is the research division of the Children's Hospital Foundation of Manitoba. At the institute, more than 270 world-class pediatric medical researchers, technical staff, students and support staff are involved in more than \$20 million of research and clinical trial activity each year.

About the BC Children's Hospital Research Institute: BC Children's Hospital Research Institute conducts discovery, translational and clinical research to benefit the health of children and their families. We are supported by BC Children's Hospital Foundation; are part of BC Children's Hospital and the Provincial Health Services Authority; and work in close partnership with the University of British Columbia. For more information, visit www.bcchr.ca or follow us on Twitter [@BCCHResearch](#).

About the University of British Columbia: The University of British Columbia is a global centre for research and teaching, consistently ranked among the top 20 public universities in the world. Since 1915, UBC's entrepreneurial spirit has embraced innovation and challenged the status quo. UBC encourages its students, staff and faculty to challenge convention, lead discovery and explore new ways of learning. At UBC, bold thinking is given a place to develop into ideas that can change the world. For more information, visit www.ubc.ca or follow us on Twitter @UBC.

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Media Contacts:

Stephanie Matthews
Children's Hospital Research Institute of
Manitoba
Tel: 204-272-3135
smatthews@chr.ca

Ilana Simon
Rady Faculty of Health Sciences,
University of Manitoba
Cell: 204-295-6777
ilana.simon@umanitoba

Alan Worsley
BC Children's Hospital
Provincial Health Services Authority
Cell: 604 600 5341
Alan.Worsley@bcchr.ca

Kim Wright
AllerGen Inc.
Cell: 905-330-2777
kimwright@allergen.ca

Kerry Blackadar
Faculty of Medicine
University of British Columbia
Tel: 604-827-2963
kerry.blackadar@ubc.ca