Study finds human milk components in amniotic fluid

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Lars Bode, PhD, associate professor of pediatrics at UC San Diego School of Medicine and director of the Larsson-Rosenquist Foundation Mother-Milk-Infant Center of Research Excellence (LRF MOMI CORE). Credit: UC San Diego Health

Human milk oligosaccharides (HMOs) are complex carbohydrates that are highly abundant and unique to human milk. Accumulating evidence indicates that exposure to HMOs in the postnatal period has both immediate and long-term benefits to infant health and development. Previous studies have shown that HMOs are present in maternal urine and blood during pregnancy, as early as the first trimester, but researchers at University of California San Diego School of Medicine report for the first time that HMOs are also present in amniotic fluid.

The study is published in the October 2 issue of *Frontiers in Pediatrics-Neonatology*.

"So far, research around human milk oligosaccharides has focused on the breast-fed infant, but our latest discovery suggests that the benefits of HMOs may begin much earlier and affect the growing fetus," said Lars Bode, Ph.D., associate professor of pediatrics at UC San Diego School of Medicine (www.bodelab.com) and director of the Larsson-Rosenquist Foundation Mother-Milk-Infant Center of Research Excellence (LRF MOMI CORE).

HMOs are natural prebiotics that contribute to the shaping of the infant gut microbiome, which may affect disease risk, such as infectious diarrhea or necrotizing enterocolitis, a condition that impacts the intestine of premature infants, and potentially also non-communicable diseases like asthma, allergies and obesity later in life. "Our findings that HMOs appear in amniotic fluid opens up an entirely new field of

research and expands the HMO focus throughout development and after birth," said Bode.

The study enrolled 48 pregnant women and collected their urine and amniotic fluid at delivery, as well as their milk four days postpartum.

Similar to the effects reported for the postnatal phase, HMOs in amniotic fluid may influence the early microbiome and also prevent infections and regulate immune responses that would otherwise raise the risk for preterm birth.

"HMOs could also potentially be involved in prenatal lung or brain development," said Bode. "We don't know yet how early during pregnancy HMOs appear in the amniotic fluid, but imagine if we could screen HMOs in amniotic fluid as a marker for preterm delivery risk."

The new findings, he said, warrant additional research in how HMOs impact maternal and infant health at the perinatal and neonatal stage, including investigation of their potential life-long consequences.

More information: Audra Wise et al, Infants Are Exposed to Human Milk Oligosaccharides Already in utero, *Frontiers in Pediatrics* (2018). DOI: 10.3389/fped.2018.00270

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