

Genetic tests of amniotic fluid could guide timing of delicate births

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Analyzing gene expression of an expectant mother's amniotic fluid could give doctors an important tool for deciding when it is safe to deliver premature babies.

Researchers at Cincinnati Children's Hospital Medical Center report they have identified a way to test RNA and specific genetic signatures in amniotic fluid to see whether fetal lungs - and potentially other organs - are mature enough for a safe and viable delivery. The paper is published online in the journal *BMC Medical Genomics*.

"This study demonstrates the feasibility of testing amniotic fluid to identify biomarkers for fetal organ maturation to better enable obstetricians to make delivery planning decisions for preterm births," said Beena Kamath-Rayne, MD, MPH, a lead author and researcher in the Perinatal Institute at Cincinnati Children's. "This will allow pediatricians and neonatologists to prepare for the various neonatal morbidities these preterm infants may face, and allow obstetricians to better weigh risks to the baby when making decisions about preterm delivery."

In the study, researchers isolated and characterized RNA in [amniotic fluid](#) at different pregnancy time points: 18 to 24 weeks; 34 to 36 weeks and 39 to 40 weeks. Genetic analysis at different pregnancy time points showed a strong correlation with cell types found in the intrauterine environment. They found that the presence of some RNA and genes expressed at certain time points were associated with characteristics of

fetal immaturity, such as respiratory distress.

Researchers identified 257 genes that were expressed differently in late preterm fetuses (34-36 weeks) compared to full-term fetuses. Through additional analysis, the authors linked genes expressed differently in preterm fetuses to underdeveloped lungs, decreased lean body mass and immature feeding patterns.

The authors emphasize that additional research is needed beyond the current study, in part because of its small study sample involving only 16 women, all of whom participated after giving prior consent.

The study takes a very specific aim at the persistent public health problem of premature birth - in this case children who because of medical necessity are scheduled for elective birth before the full-term gestation period of 39 weeks. In 2008, the American Congress of Obstetricians and Gynecologists recommended testing fetal lung maturity for all elective deliveries prior to 39 weeks, but this recommendation has been withdrawn. Subsequent research shows that focusing only on fetal lung maturity is not sufficient to determine a baby's readiness for postnatal life, according to the authors.

The research team is preparing to confirm their current results with a larger study. The authors will then work towards developing a test to assess fetal maturity that can be done in the expectant mother's blood or urine so that amniocentesis can be avoided, Kamath-Rayne said

Provided by Cincinnati Children's Hospital Medical Center

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