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RNA Molecules in Maternal Blood May Predict Pregnancies at Risk for Preeclampsia

Study finds that microRNA biomarkers in asymptomatic pregnant women might reveal higher risk for the common and serious pregnancy complication; early identification could lead to prevention and better maternal and newborn outcomes

Small non-coding RNA molecules, called microRNAs (miRNAs), found and measured in the blood plasma of asymptomatic pregnant women may predict development of preeclampsia, a condition characterized by high blood pressure and abnormal kidney function that affects roughly 5 to 8 percent of all pregnancies. Preeclampsia is responsible for a significant proportion of maternal and neonatal deaths, low birth weight and is a primary cause of premature birth.



Preeclampsia is a common, serious complication of pregnancy, characterized by high blood pressure and abnormal kidney function. It is a primary cause of premature birth.

The findings are reported in the May 19, 2020 issue of *Cell Reports Medicine* by researchers at University of California San Diego School of Medicine and Sera Prognostics, Inc., a Salt Lake City-based company that makes diagnostics tests for predicting the risk of premature birth.

“The ability to identify pregnancies at high risk for developing preeclampsia would be of great value to patients and their doctors to better personalize prenatal care,” said senior author Louise Laurent, MD, PhD, professor in the Department of Obstetrics, Gynecology and Reproductive Sciences at UC San Diego School of Medicine. “This would enable prompt detection and optimal management of pregnancies that develop preeclampsia. And the information could be used to better identify participants for research studies testing preventive therapies.”

Preeclampsia is a common and serious complication of pregnancy. It is estimated to be the cause of 15 percent of preterm births and 14 percent of maternal deaths worldwide. Symptoms of preeclampsia — most notably hypertension, but also sudden weight gain, swelling, severe headaches, abdominal pain and nausea — appear during the second half of pregnancy, though Laurent said studies suggest the disorder is caused by problems with placental development early in pregnancy. Delayed diagnosis and suboptimal management of preeclampsia typically results in poorer outcomes for mother and child.

The new study involved 141 subjects (49 cases, 92 controls) in the discovery cohort and 71 subjects (24 cases, 47 controls) in a separate verification cohort. Researchers found that two single-miRNA biomarkers (univariate) and 29 two-miRNA (bivariate) biomarkers measured in the serum of asymptomatic pregnant women between 17 and 28 weeks of pregnancy were able to predict later onset of preeclampsia.

Laurent said the next step will be to validate these miRNA biomarkers in a large independent pregnancy cohort, with the ultimate goal of developing a clinical test for screening women early in pregnancy for increased risk of preeclampsia.

“We look forward to the clinical validation of these novel miRNA biomarkers of preeclampsia through our continued collaboration with Dr. Laurent and UC San Diego,” said Jay Boniface, PhD, chief scientific officer at Sera and a study co-author. “Innovative bioinformatics approaches have enabled their discovery and the prospect of creating predictors for individualized risk of pregnancy complications.”

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