New research shows genes of pregnant women and their fetuses can increase the risk of preterm labor

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New evidence that genetics play a significant role in some premature births may help explain why a woman can do everything right and still give birth too soon.

Research presented today at the 30th Annual Society for Maternal-Fetal Medicine (SMFM) meeting -- The Pregnancy Meeting -- showed that the genes of both the mother and the fetus can make them susceptible to an inflammatory response that increases the risk of preterm labor and birth.

Silent, undetected infections and inflammation are major risk factors for preterm labor and birth, says SMFM member Roberto Romero, MD, Chief of the Perinatology Research Branch at the National Institute of Child Health and Human Development. One of every three preterm births occurs to a mother who has an infection in her uterus, but has no symptoms.

Dr. Romero led a team of physicians and scientists studying a large number of genes involved in the control of labor that could help explain the complex process that triggers preterm birth. They found DNA variants in genes involved in fighting infection in the pregnant woman and the fetus. Although these variants increased the risk of preterm labor and birth, they have been preserved by evolution because they are needed to fight infection, Dr. Romero said.

Premature birth is a leading cause of infant death in the United States, and babies who survive face serious lifelong health problems. More than 543,000 babies are born too soon each year, and the nation's preterm birth rate has increased 36 percent since the early 1980s. Worldwide, about 13 million babies are born prematurely each year.

"This research gives us even more evidence as to the relationship between genetics and preterm birth and is a step toward personalized medicine," said Alan R. Fleischman, MD, medical director of the March of Dimes. "This has the potential to allow us to identify a woman who is at risk for delivering early and provide her with specialized, individualized care so that she may carry her baby to term, and help give more babies a healthy start in life."

All patients in the case-control study had at least one prior spontaneous preterm birth (less than 37 weeks of gestation). The study extracted DNA from the cord blood and maternal blood of more than 800 pregnant Hispanic women and their fetuses, and then genotyped more than 700 single nucleotide polymorphisms (SNPs) in 190 candidate genes that may predispose to preterm birth.

Fetuses that carried a SNP gene variation in IL6R, which influences inflammation, had twice the risk of preterm birth. DNA variants in maternal genes also increased the risk of preterm birth. Together these factors provide new evidence that genetic predisposition to preterm birth can depend on the DNA of both mother and fetus and how the two interact.

Today's award-winning study, "Identification of Fetal and Maternal Single Nucleotide Polymorphisms in Candidate Genes that Predispose to Spontaneous Preterm Labor with Intact Membranes," is the seventh study by SMFM members to be honored by the March of Dimes for innovative research focused on preventing premature birth. The March

of Dimes is conducting a national Prematurity Campaign aimed at using research and awareness to reduce the increasing rate of premature birth.

Provided by March of Dimes Foundation