UC San Diego
UC San Diego News Center

November 09, 2016 | By Scott LaFee

Blood Test May Help Identify Fetal Alcohol Spectrum Disorders

Researchers at University of California San Diego School of Medicine, Texas A&M College of Medicine and the Omni-Net Birth Defects Prevention Program in Ukraine have identified a blood test that may help predict how severely a baby will be affected by alcohol exposure during pregnancy, according to a study published November 9 in the journal *PLOS ONE*.

Study authors say the findings could facilitate early intervention to improve the health of infants and children who were prenatally exposed to alcohol.

Fetal alcohol syndrome is a severe form of a spectrum of mental and physical disabilities called fetal alcohol spectrum disorders (FASD) that can affect children's development with long-lasting consequences. In the United States and Western Europe, it's estimated that 2 to 5 percent of school-age children are affected by FASD. In some parts of the world, the number is higher.

Children and adults affected by FASD may experience a range of symptoms, from physical changes like a small head and subtle differences in facial characteristics to learning difficulties and behavioral issues.

Despite widespread prevention guidelines, drinking during pregnancy still occurs, in part because roughly half of pregnancies in the United States are unplanned and many women may not realize that they need to stop consuming alcohol before harm occurs.

"It's a huge problem," said Rajesh Miranda, PhD, professor in the Texas A&M College of Medicine and co-senior author of the study, "but we might not realize the full scope because infants born with normal-looking physical features may be missed, making many cases difficult to diagnose early."

Seeking to develop a predictive test using biomarkers, researchers looked at birth outcomes for 68 pregnant women enrolled in the study at two perinatal care clinics in western Ukraine. The team obtained detailed health and alcohol consumption histories and second and third trimester blood samples from each woman. The results indicated that moderate to high levels

of alcohol exposure during early pregnancy resulted in significant differences in some circulating small RNA molecules called microRNAs (miRNAs) in maternal blood. These differences were particularly notable in mothers whose infants showed some physical or neurobehavioral signs of alcohol effects in the first 12 months of life.

“Collectively, our data indicate that maternal plasma miRNAs may help predict infant outcomes and may be useful to classify difficult-to-diagnose FASD subpopulations,” Miranda said.

Part of the reason FASD can be difficult to diagnose is because infants with similar amounts of prenatal alcohol exposure may have vastly different outcomes.

“Although it is generally true that binge-drinking during pregnancy presents the greatest risk, not all women who consume substantial amounts of alcohol in pregnancy will have a child who is clearly affected,” said Christina Chambers, PhD, professor of pediatrics at UC San Diego School of Medicine, principal investigator on the Ukraine project and co-senior author.

“That’s why we examined specific biomarkers in the mother’s blood in the second and third trimester of her pregnancy to determine if they are useful in identifying children who could benefit from early interventions.”

Although FASD cannot be cured, early diagnosis is vital. “Early diagnosis is important because it permits early intervention to minimize the harm due to prenatal alcohol exposure,” said Wladimir Wertelecki, MD, research team leader in Ukraine. “Good nutrition, better perinatal health care, lowering stress levels and infant care interventions can all improve the outcome of alcohol-affected pregnancies.”

The scientists said their next steps will include repeating the investigation in other, larger samples of mothers and infants, and determining if these early markers are predictive of longer term developmental outcomes for children exposed to alcohol.

“If we can reset developmental trajectories earlier in life, it is a lot easier than trying to treat disabilities later in life,” Miranda said. “We hope this work will lead to a test that can allow health care providers to identify the mothers and infants most at risk and provide them with extra care for the best outcome possible.”

Co-authors of the paper include: Sridevi Balarama, and Alexander M. Tseng, Texas A&M Health Science Center; and Lyubov Yevtushok, and Natalya Zymak-Zakutnya, Omni-Net Ukraine Birth Defects Prevention Program.

Funding for this research came, in part, from the National Institutes of Health (U01AA014835, U24AA014811, R01AA013440) and the Collaborative Initiative on Fetal Alcohol Spectrum Disorders.

MEDIA CONTACT

Scott LaFee, 858-249-0456, slafee@ucsd.edu
Holly Shive, Texas A&M, 979-436-0613 hshive@tamhsc.edu

UC San Diego's Studio Ten 300 offers radio and television connections for media interviews with our faculty, which can be coordinated via studio@ucsd.edu. To connect with a UC San Diego faculty expert on relevant issues and trending news stories, visit https://ucsdnews.ucsd.edu/media-resources/faculty-experts.