DNA test that identifies Down syndrome in pregnancy can also detect trisomy 18 and trisomy 13

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A newly available DNA-based prenatal blood test that can identify a pregnancy with Down syndrome can also identify two additional chromosome abnormalities: trisomy 18 (Edwards syndrome) and trisomy 13 (Patau syndrome). The test for all three defects can be offered as early as 10 weeks of pregnancy to women who have been identified as being at high risk for these abnormalities.

These are the results of an international, multicenter study published on-line today in the journal *Genetics in Medicine*. The study, the largest and most comprehensive done to date, adds to the documented capability (study published in *Genetics in Medicine* in October 2011) of the tests by examining results in 62 pregnancies with trisomy 18 and 12 pregnancies with trisomy 13. Together with the Down syndrome pregnancies reported earlier, 286 trisomic pregnancies and 1,702 normal pregnancies are included in the report.

The research was led by Glenn Palomaki, PhD, and Jacob Canick, PhD, of the Division of Medical Screening and Special Testing in the Department of Pathology and Laboratory Medicine at Women & Infants Hospital of Rhode Island and The Warren Alpert Medical School of Brown University, and included scientists at Sequenom Inc. and Sequenom Center for Molecular Medicine, San Diego, CA, and an independent academic laboratory at the University of California at Los Angeles.

The test identified 100% (59/59) of the trisomy 18 and 91.7% (11/12) of the trisomy 13 pregnancies. The associated false positive rates were 0.28 and 0.97%, respectively. Overall, testing failed to provide a clinical interpretation in 17 women (0.9%); three of these women had a trisomy 18 pregnancy. By slightly raising the definition of a positive test for chromosome 18 and 13, the detection rate remained constant, but the false positive rate could be as low as 0.1%. These findings, along with the detailed information learned from testing such a large number of samples, demonstrate that the new test will be highly effective when offered to women considering invasive testing.

"Our previous work demonstrated the ability to identify Down syndrome, the most common trisomy. These new data extend the finding to the next two most common trisomies and will allow for wider use of such testing with the ability to identify all three common trisomies," said Dr. Palomaki. "The new DNA test can now also be offered to women identified as being as high risk for trisomy 18 or trisomy 13, as well those at high risk for Down syndrome."

"This highly sensitive and specific DNA test has the potential to impact on couples' decision-making," says Dr. Canick. "A woman whose pregnancy was identified as high risk who earlier would have chosen not to have invasive diagnostic testing, might now consider the DNA test as a safe way to obtain further information, before making a final decision." The US Centers for Disease Control and Prevention estimated in 1995 that about one in every 200 invasive diagnostic procedures will cause a pregnancy miscarriage.

Trisomy 18, also called Edwards syndrome, is a serious disorder with up to 70% of first trimester affected fetuses being spontaneously lost during pregnancies. Among those born alive, half die within a week with only 5% surviving the first year. All have serious medical and developmental problems. About 1,330 infants with trisomy 18 would be born in the US each year in the absence of prenatal diagnosis. Trisomy 13, also called Patau

syndrome, is less common but equally serious. About 600 infants with trisomy 13 would be born in the US each year in the absence of prenatal diagnosis. Like Down syndrome, trisomy 18 and trisomy 13 are more common as maternal age increases. For comparison, about 7,730 Down syndrome cases would be born each year in the absence of prenatal diagnosis. Current prenatal screening tests for trisomy 18 and trisomy 13 rely on both biochemical and ultrasound markers. For more information visit the US National Library of Medicine PubMed Health.

This industry-sponsored project, awarded to Drs. Palomaki and Canick and Women & Infants Hospital in 2008, enrolled 4,500 women at 27 prenatal diagnostic centers throughout the world. Women & Infants also served as one of the enrollment centers under the direction of maternal-fetal medicine specialist and director of Perinatal Genetics, Barbara O'Brien, MD.

"It is clinically more relevant that all three trisomies can be detected by this test," said Dr. O'Brien. "Having access to such a comprehensive, DNA-based test that can be done early in pregnancy will give us more information so that we can better guide which patients should consider diagnostic testing."

Provided by Women & Infants Hospital