

Non-invasive test could be used to predict premature birth and delivery of small babies

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Testing for the presence of specific molecules present in the urine of pregnant women can give an indication in early pregnancy of whether a baby will be born premature or the fetus will suffer poor growth, according to research published in the open access journal *BMC Medicine*. Identifying these conditions early in pregnancy could potentially help reduce complications and manage any difficulties, although more work is needed before the findings can be translated to clinical settings.

Researchers from Imperial College London and the University of Crete analyzed the metabolites - small molecules excreted in urine - of 438 [pregnant women](#) in the Rhea cohort. They found that elevated urinary levels of the amino acid lysine were associated with spontaneous premature birth. In contrast, increased levels of a N-acetylated glycoprotein – a molecule consisting of a carbohydrate and a protein - tended to be found in women who had to be induced early. Decreased levels of a third group of molecules: acetate, formate, tyrosine and trimethylamine were associated with poor fetal development. Women with decreased levels of these urine metabolites also showed signs of an increased risk of diabetes, such as higher blood insulin.

The Rhea cohort is a large population case-control mother-child study that started in Crete in 2007. Urine samples were collected early in pregnancy at the first ultrasound appointment. Preterm birth and [fetal growth restriction](#) has been shown to increase the chance of developing metabolic and cardiovascular disorders later in life.

Hector Keun, lead researcher from the Department of Surgery and Cancer at Imperial College London, says: "While we know that metabolism in the mother changes substantially during pregnancy to help supply the growing fetus with nutrients, we were surprised to see so early in pregnancy a link between metabolites that we could easily detect in a urine sample and low birthweight. Our findings imply that it could be possible to improve the identification of women at higher risk of delivering smaller babies or premature delivery using non-invasive metabolic profiling technology early in pregnancy."

Further research needs to focus on whether changes in these metabolites are induced by pregnancy or indicate an underlying risk factor. It also remains to be seen if these results can be applied to a wider population and more research is needed before any such test could be used in practice.

Hector Keun says: "Future investigation of the factors that produce the molecules associated with these pregnancy outcomes should improve our understanding of the genetic and environmental factors that influence restricted fetal growth and thus help us to reduce the likelihood of these events. We will also go on to test if exposure to these metabolites during [pregnancy](#) has a lasting impact on child development after birth."

More information: Urinary metabolic profiles in early pregnancy are associated with preterm birth and fetal growth restriction in the Rhea mother-child cohort study Léa Maitre, Eleni Fthenou, Toby Athersuch, Muireann Coen, Mireille B Toledano, Elaine Holmes, Manolis Kogevinas, Leda Chatzi and Hector C Keun *BMC Medicine* 2014, 12:110. www.biomedcentral.com/1741-7015/12/110

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