

Biomarkers provide potential for better preeclampsia detection

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Identifying biomarkers could lead to earlier detection of preeclampsia, which in turn can lead to healthier mothers and children, according to a collaborative study from the Centre of Molecular Inflammation Research (CEMIR) and the MR Cancer Group at the Norwegian University of Science and Technology (NTNU). Their findings, "Metabolomic Biomarkers in Serum and Urine in Women with Preeclampsia," will be published in *PLOS ONE* on 17 March.

"We have found that the metabolism in women who experience preeclampsia is clearly different from women with normal pregnancies. The differences suggest that preeclampsia has a similar profile to cardiovascular disease, and the inflammatory processes are reflected in the blood and urine of affected women. This [abnormal metabolism](#) may be present earlier, so that the disease may be predicted before onset," says Marie Austdal, a PhD candidate at NTNU, and first author of the study.

Preeclampsia is a disease of pregnancy that has its origins in insufficient development of the placenta during the first trimester, but usually only presents itself close to term, causing [high blood pressure](#) (hypertension) and proteins in the urine (proteinuria) of the affected women. The syndrome can be dangerous for both mother and unborn child, causing preterm birth and restrictions in fetal growth, along with an increased risk of [cardiovascular disease](#) later in life for both. Preeclampsia is thought to be related to an exaggerated immune response from the beginning of pregnancy.

The researchers found a set of biomarkers in urine and serum samples that were different between women with preeclampsia, women with normal pregnancies and women who were not pregnant. These biomarkers tell the story of what is happening to the metabolism of these women when they have developed the disease.

There was a clear and significant difference in the metabolomic profile of all three groups of women. The differences could be associated with increases in very [low density lipoprotein](#) (VLDL) fats and cholesterol for the preeclamptic women, and also reflected an increased stress response and inflammation in preeclampsia.

The metabolic profiles show that the metabolism of pregnant women is highly affected by [preeclampsia](#). It is possible that the metabolism may be changed even earlier, before the diagnostic events (hypertension and proteinuria) appear. If the changes can be detected as early as the first trimester, it may be possible to prevent some of the women from developing the disease, leading to healthier mothers and children.

The study is a collaboration between the Research Group of Inflammation and Genetics in Pregnancy, and the MR Cancer group. The group used NMR spectroscopy to characterize biofluids using the magnetic properties of atoms. The method is called metabolomics – the study of low molecular weight metabolites. Metabolites are intermediates and end processes of the chemical interactions in the body that are necessary for life.

The next project for the group is to use the same method to analyze samples from [women](#) in early pregnancy, for possible prediction of the disease.

More information: [dx.plos.org/10.1371/journal.pone.0091923](https://doi.org/10.1371/journal.pone.0091923)

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