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Researchers find potential new diagnostic tool to help pregnant women at risk

Collaborative effort between the University of Lethbridge and other Alberta universities has identified a new technique to help identify women at risk of metabolic disorders

Between three and 20 per cent of pregnant women in Canada develop gestational diabetes mellitus, or GDM, and the health of both the mother and her developing child can be negatively affected if left untreated.

A study by researchers at the University of Lethbridge, in collaboration with the University of Calgary and the University of Alberta, has identified a technique that may one day help health-care professionals identify women at risk of developing GDM early in their pregnancy. Their study, *Metabolic dysfunction in pregnancy*, was recently published by [Wiley](#).



Hannah Scott (BSc '17), a master's student at the U of L's Canadian Centre for Behavioural Neuroscience, wanted to know if specific biomarkers could identify a pregnant woman's risk for obesity and GDM. She and her team obtained urine samples collected through the [Alberta Pregnancy Outcomes and Nutrition](#) (APrON) study. This long-term study, directed by researchers at the University of Calgary, involves thousands of women from Calgary and Edmonton and is designed to analyze the relationship

between pregnant women's nutrition, their mental health and the health and development of their children. Dr. Brenda Leung, a U of L associate professor in the Faculty of Health Sciences, was involved in starting APrON 10 years ago as a doctoral student at the U of C and she continues to be involved as an investigator. Leung facilitated the collaboration between APrON and the U of L research team.

"We examined these samples for biomarkers of risk using proton nuclear magnetic resonance (NMR) spectroscopy," says Scott. "What we were looking for was a profile, or you can think of it as a metabolite fingerprint, associated with the diseases or the later development of the diseases."

The urine samples were taken before the development of GDM. By using NMR, the researchers could identify the women who were obese, those who later developed GDM and those who were part of the control group. This study shows it's possible to predict if a woman will develop GDM based on a urine sample taken before any symptoms appear.

"We've established that those groups have unique urinary fingerprints or profiles that distinguish them," says Tony Montana (BSc '08, MSc '10), NMR facility manager. "Something chemically or biochemically is different between them and we can accurately detect these differences."

Using urine analysis for metabolomics is a relatively new field of research; most previous studies have used blood samples. The goal of studies like this one is to create diagnostic tests that can catch diseases early or even before they begin.

"There's a huge trend now for predictive, personalized medicine and diagnostics," says Dr. Gerlinde Metz, a professor at the Canadian Centre for Behavioural Neuroscience. "There is a lot of hype around NMR because, not only is it less expensive than other methods, it's also more accessible."

Gestational diabetes presents short- and long-term risks to both mother and child. Having a non-invasive diagnostic test available would allow for early intervention through lifestyle recommendations and dietary changes.

"This paper shows the best kind of collaborative work where you have outstanding researchers at the U of C, U of A and U of L collaborating to do great work with clinical impacts," says Dr. Nicole Letourneau, APrON team leader and professor in the U of C's Faculty of Nursing. "The fact we might be able to predict who develops gestational diabetes mellitus before they do and before we start to see impacts on mom's health and the child's fetal development and health outcomes, has tremendous clinical implications. That we in Alberta have collaborated to do that kind of work says a lot about APrON and the quality of people we have here in the province."

The APrON Study was established by a \$5 million grant from Alberta Innovates. This paper was made possible thanks to a grant from Alberta Health Services' Diabetes, Obesity and Nutrition Strategic Clinical Network.

This news release can be found online at [Metabolic Dysfunction in Pregnancy](#).

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