

# Metabolomic analysis for respiratory and neurologic diseases

In children, problems with breathing are the leading cause of hospitalization.



The current diagnostic tests for respiratory diseases and reliance on therapy trials are expensive to the healthcare system and have negative impact on the overall quality of a patient's health. [Dr. Darryl Adamko](#) and collaborators are currently working on a novel way to diagnose and monitor patients with asthma using mass spectrometry analysis of urine. Biomarker discovery is a key application in metabolomics that aims to improve disease diagnosis and prognosis. This work has great potential to improve the care for patients with respiratory diseases.

Further Reading:

[Comparison of accuracy and precision between multipoint calibration, single point calibration, and relative quantification for targeted metabolomic analysis.](#)

# Improved Diagnosis of Pediatric Asthma: Metabolomic Analysis of Urine

Asthma is the most frequent chronic disease of children and the number one reason for pediatric emergency admissions in Canadian hospitals.

Treatment often requires anti-inflammatory drugs like corticosteroids, which can have unwanted side-effects. To measure inflammation, one could use a biopsy however this is potentially dangerous and painful. Other less invasive tests are available, but they are less accurate and not suited for the average doctor's office. There is an urgent need for a better test. The lung tissue damage from asthma creates unique markers in the body that can be measured in the urine. It is believed that measuring these biomarkers in the urine will reflect changes in the disease. It is suspected that the amount of these urine markers will decrease after the treatment of the diseases. [Dr. Darryl Adamko](#) hopes that the urine test will not only diagnose asthma better than available techniques but will also help to better adjust the amount of medicine a child needs.

Further Reading:

[Quantitative determination of potential urine biomarkers of respiratory illnesses using new targeted metabolomic approach.](#)

[Urine metabolomic profiling of children with respiratory tract infections in the emergency department: a pilot study.](#)

## Early Recognition of Neonatal HIE Through Urine Metabolomics and EEG Analysis

Hypoxic ischemic encephalopathy (HIE) can be devastating in newborns and has the potential to cause serious long-term disability.



Early recognition and introduction of appropriate treatment is crucial in halting HIE progression. Early application of therapeutic hypothermia has become a standard of care especially within the first 6 hours of life; however, not all cases of neonates with HIE are recognized at an early stage despite intensive clinical monitoring. Often clinical evidence of HIE does not manifest in the first 24 hours of life when interventions are needed which leads to severe brain injury (e.g. cerebral palsy). Metabolomics is the study of small molecules created by cell activity. In disease states, cells produce different chemical substances, which can be measured in a human body. [Salah Almubarak](#) and researchers aim to discover novel biological markers by using urine metabolomic analysis and comparing it to neonatal Electroencephalogram (EEG), in order to recognize HIE at early stage from birth. This has the potential to become a reliable screening tool to guide early diagnosis, prevention of HIE progression and improve long-term neonatal outcome.