

Unique insight into babies' cerebral fuel

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Newly published research from a Te Herenga Waka—Victoria University of Wellington-led study provides the first reliable data of its kind measuring normal patterns of plasma ketones and lactate levels in healthy babies shortly after birth.

Ketones (beta-hydroxybutyrate) and lactate can provide alternative cerebral fuel when a baby has hypoglycaemia (low [blood glucose](#) concentrations), which is common and linked to poor neurological outcomes.

The Glucose in Well (GLOW) Babies Study of 67 infants, led and designed by Dr. Deborah Harris, a senior lecturer in the University's School of Nursing, Midwifery and Health Practice, has shown previously that at-risk [babies](#) being treated in hospital for hypoglycaemia have no or very low levels of ketones and very little lactate.

"We thought this was because they were at risk. We can now see this is similar in [healthy babies](#)," says Dr. Harris.

"In healthy babies, when [glucose levels](#) are low lactate levels don't increase to compensate. Also, ketone levels are slow to increase, doing so only

after more than 12 hours of low glucose levels, and never on the first day when low glucose levels are most common.

"That means even healthy babies are unlikely to be receiving any neuroprotection from ketones or lactate for acute or early low [blood glucose levels](#)."

Blood glucose levels change rapidly in the hours after birth, with 'heel prick' testing usually only performed on babies considered 'at risk' of low levels, meaning preterm, born small or large, or infants of diabetic mothers.

However, the GLOW Babies Study has also shown many healthy babies have [blood](#) glucose levels that would be considered low in a baby identified as at risk.

Dr. Harris hopes the study's findings can be used to develop new national guidelines for diagnosing, treating, and managing neonatal hypoglycaemia.

"Clinically, we've focused primarily on glucose in the past because it's the main cerebral fuel and can be measured. We know the brain can also use lactate and ketones but these have been difficult to measure in babies," she says.

"The GLOW Babies Study has found a way to measure blood [glucose](#), [lactate](#), and ketones at the same time, using very small amounts of blood, and all the babies completed the study in their own homes. This meant we were able to capture information about the normal patterns of these important fuels.

"This is an important new piece of the puzzle in our understanding about how babies adjust following birth and we will be following this cohort as they grow older."

The new research paper, in the *Journal of Pediatrics*, is one of three now published resulting from the study. Further papers are to come.

Other leading international researchers in this area have acknowledged Dr. Harris for the unique contribution the study makes.

More information: Deborah L. Harris et al. Alternative Cerebral Fuels in the First Five Days in Healthy Term Infants: The Glucose in Well Babies (GLOW) Study, *The Journal of Pediatrics* (2020).
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