

# Gestational age estimated through DNA methylation

October 11 2016, by Quinn Eastman

---



Credit: Emory University

Researchers have developed a method for estimating developmental maturity of newborns. It is based on tracking DNA methylation, a structural modification of DNA, whose patterns change as development progresses before birth.

The new method could help doctors assess developmental maturity in [preterm newborns](#) and make decisions about their care, or estimate the time since conception for a woman who does not receive prenatal care during pregnancy. As a research tool, the method could help scientists study connections between the prenatal environment and health in early childhood and adulthood.

The study, led by Alicia Smith, PhD and Karen Conneely, PhD, used blood samples from more than 1,200 newborns in 15 cohorts from

around the world. The results are published in *Genome Biology*.

Smith is an associate professor and vice chair of research for the Department of Gynecology and Obstetrics in the School of Medicine, and Conneely is an assistant professor in the Department of Human Genetics. The first author, Anna Knight, is a graduate student in the Genetics and Molecular Biology Program.

Gestational age, is normally estimated by obstetricians using ultrasound during the first trimester, by asking a pregnant woman about her last menstrual period, or by examining the baby at birth. Ultrasound is considered to be the most precise estimate of gestational age. This work extends upon earlier studies of [DNA methylation](#) patterns that change over development and predict age and age-related health conditions in children and adults.

The Emory team gathered DNA methylation data from previous studies examining live births and health outcomes, and used an unbiased statistical learning approach to select 148 DNA methylation sites out of many thousands in the genome. By examining methylation at those sites, [gestational age](#) could be accurately estimated between 24 and 44 weeks, the authors report. The median difference between age determined by DNA methylation and age determined by an obstetrician estimate was approximately 1 week.

The researchers also found that the difference between a newborn's age predicted by DNA methylation and by an obstetrician may be another indicator of developmental maturity, and is correlated with birthweight, commonly used as an indicator of perinatal health.

In [a group of newborns from Tennessee](#), the researchers observed that developmental maturity based on DNA methylation tended to be lower for the children of women in the Medicaid program compared to those

with [private health insurance](#). It is not yet clear if this finding can be extended to other groups, the authors say.

"This association supports the hypothesis that prenatal adversity associates with changes in neonatal methylation consistent with a delayed developmental age, which may have consequences later in life," the authors write.

**More information:** Anna K. Knight et al. An epigenetic clock for gestational age at birth based on blood methylation data, *Genome Biology* (2016). [DOI: 10.1186/s13059-016-1068-z](https://doi.org/10.1186/s13059-016-1068-z)

Provided by Emory University

Citation: Gestational age estimated through DNA methylation (2016, October 11) retrieved 27 April 2024 from <https://medicalxpress.com/news/2016-10-gestational-age-dna-methylation.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--