

Nurses' care of young mothers leaves traces in babies' DNA

May 2 2018



A depiction of the double helical structure of DNA. Its four coding units (A, T, C, G) are color-coded in pink, orange, purple and yellow. Credit: NHGRI

Researchers have known for a couple of decades that early life adversity can affect the way that particular genes function through a process called epigenetics—a bit like a dimmer switch on a light, pushing gene activity up or down. What they haven't been able to show until now is that positive early life experiences can have a similar effect, and that these effects can be seen over thirty years later.

In a study, recently published in *Translational Psychiatry*, a McGill-led team of scientists have been able to demonstrate long-lasting but subtle effects, at a genetic level, on the offspring of young mothers who took part in a nurse visitation program for vulnerable first time moms. This is the longest-running study of its kind, and the first to look at how positive psychosocial interventions can leave an epigenetic trace.

Advice from nurses for mothers-at-risk

In 1977 young, pregnant, first-time mothers from low-income families in a town in upstate New York were assigned to one of two groups. One group of women was offered free assessments of child development and transportation to a clinic for their medical appointments. The other women could have up to two years of home visits from trained nurses from the Nurse Family Partnership program who shared practical information about child rearing and family planning. The number of visits varied from one woman to another, from as few as six visits to as many as 30, but the impact of these visits can be seen today.

There were 400 women enrolled in the initial study. Now, over 30 years later, close to half of their offspring took part in a follow-up study. Their numbers were fairly evenly divided between the offspring of women who had received visits from nurses (99 people) and those who had not (89 people). One part of the current study involved responding to an online questionnaire about [mental health](#) diagnoses of illnesses ranging from major depression to substance abuse. Here, the researchers saw

little difference between the offspring of the women who had received visits from nurses and those who had not. (Though because only half of the initial group took part in the follow-up study, the researchers suggest that it is possible that this was a self-selecting group who were more likely to have experienced abuse along with psychiatric disorders.)

A small but important step along the way

But it was when the researchers took blood samples to gain a picture of what was going on at a [genetic level](#), that they saw a significant though subtle difference between the two groups.

"Initially we ran just a small subgroup of participants and we found evidence of an association between a psychosocial intervention that ended at the age of two and changes in DNA methylation, a modification to DNA that can change the way that certain genes are expressed," says Kieran O'Donnell, the lead author who is based at McGill University. "So, I held my breath waiting for the analysis on the full cohort, and then we saw that the results held."

DNA methylation is a process whereby groups of atoms (known as methyl groups) are added to DNA molecules to change the activity of a DNA segment without changing the sequence itself. Though the field of epigenetics is still relatively young and it is difficult for researchers to say exactly what the implications are of these epigenetic modifications, they believe that with further work, this information will prove useful for precision medicine efforts for children and adolescents.

Michael Meaney, the senior author who is based at the Douglas Hospital Research Centre adds, "It's fascinating to see that interventions that started while a child was in the womb and stopped by age two can leave traces that last a lifetime. This research shows that early intervention programs have an effect. But more longitudinal studies of this kind will

need to be done before we can see how this information will prove clinically useful in the treatment of child and adolescent mental health. For the time being, all we can say is that family intervention programs have left their mark, quite literally."

More information: Kieran J. O'Donnell et al. DNA methylome variation in a perinatal nurse-visitation program that reduces child maltreatment: a 27-year follow-up, *Translational Psychiatry* (2018). [DOI: 10.1038/s41398-017-0063-9](https://doi.org/10.1038/s41398-017-0063-9)

Provided by McGill University

Citation: Nurses' care of young mothers leaves traces in babies' DNA (2018, May 2) retrieved 4 May 2024 from <https://medicalxpress.com/news/2018-05-nurses-young-mothers-babies-dna.html>

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.