

Assisted reproduction technology leaves its mark on genes temporarily, study shows

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Any effect that assisted reproduction technology has on babies' genes is largely corrected by adulthood, study shows. Credit: Murdoch Children's Research Institute

Any effect that assisted reproduction technology has on babies' genes is largely corrected by adulthood, new research led by the Murdoch Children's Research Institute has found.

Published in the latest edition of *Nature Communications*, the study found events that occur in [early development](#), including ovarian stimulation, manipulation of the embryo and the extra hormones common in fertility treatment cycles, can impact gene health or

epigenetics but these effects are short lived.

Epigenetics is a process that controls how [genes](#) are turned on and off. Diet and other external environmental influences can play a role in this gene expression.

The study was designed to see how often [epigenetic changes](#) occur due to assisted [reproduction technology](#) and whether there were any differences in these changes from [birth](#) to adulthood.

"In two independent groups, we found the same effects of assisted [reproduction](#) on genes when examining heel prick blood spots collected soon after birth," study senior MCRI Professor Richard Saffery says. "These epigenetic changes were not evident in the adult blood samples."

MCRI Professor Jane Halliday, who established the cohort, and has studied the health of these individuals in adulthood, said assisted conception is linked to a small increased risk of preterm birth, low birth weight, being small for gestational age or perinatal mortality.

"Given the interventions associated with assisted reproduction technology at the time of conception, there were concerns that epigenetic changes may be taking place, silencing important genes and resulting in a heightened risk of health problems," she says.

More than seven million people around the world, including more than 200,000 people in Australia have been conceived through assisted reproduction technology since 1978.

Dr. Boris Novakovic, who performed most of the analysis for the study, says that despite the expansion of assisted reproduction technology worldwide, few studies have investigated the potential underlying effects on genes.

"Previous studies have found some epigenetic changes in embryos grown in labs. However, no study has looked for these changes in the same individuals at birth and adulthood as we have done," he says.

"Our results are reassuring for families as they suggest that environment and lifestyle experienced from birth can repair any epigenetic deviations associated with fertility treatments."

The study looked at a cohort of 158 Australians aged 22-35 years conceived through assisted reproduction technology (IVF and GIFT) and 75 people conceived naturally.

Dr. Novakovic says more studies of larger sample sizes are needed in order to replicate the current findings.

More information: Boris Novakovic et al, Assisted reproductive technologies are associated with limited epigenetic variation at birth that largely resolves by adulthood, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-11929-9](https://doi.org/10.1038/s41467-019-11929-9)

Provided by Murdoch Children's Research Institute

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