

# Genetic changes after Caesarean section may explain increased risk of developing disease

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(PhysOrg.com) -- Researchers at Karolinska Institutet have discovered that babies born by planned Caesarean section experience changes to the DNA pool in their white blood cells, which could be connected to altered stress levels during this method of delivery. The findings, presented in the July issue of the scientific journal *Acta Paediatrica*, may be a part of an explanation for why babies born by Caesarean section have an increased risk of developing certain disease in later life.

"Our results provide the first pieces of evidence that early so called epigenetic programming of the immune system during birth may have a role to play", says Professor Mikael Norman at the Department of Clinical Science, Intervention and Technology.

Caesarean section delivery is rapidly increasing worldwide and is currently the most common surgical procedure among women of child-bearing age. Until recently, the long-term consequences of this mode of delivery had not been studied. It is now thought that early [genetic changes](#) could explain why people delivered by Caesarean section in later life are more susceptible to immunological diseases such as diabetes, asthma or [leukaemia](#) than those born by normal vaginal deliveries.

In the presented study, blood was sampled from the umbilical cords of 37 newborn infants just after delivery and then again three to five days after the birth. The blood samples were analysed to see the degree of DNA-methylation (chemical altering of the DNA) in the white blood

cells, a vital part of the [immune system](#). This showed that the 16 babies born by Caesarean section exhibited higher DNA-methylation rates immediately after delivery than the 21 born by vaginal delivery. Three to five days after birth, DNA-methylation levels had dropped in infants delivered by Caesarean section so that there were no longer significant differences between the two groups.

The researchers point out, that the reason why DNA-methylation is higher after Caesarean section deliveries still is unclear and that further research is needed.

"Although we do not know yet how specific gene expression is affected after Caesarean section deliveries, or to what extent these genetic differences related to mode of delivery are long-lasting, we believe that our findings open up a new area of important clinical research" concludes lead author Titus Schlinzig, a research fellow at Karolinska Institutet.

More information: Schlinzig T, Johansson S, Gunnar A, Ekström TJ, Norman M. "Epigenetic modulation at birth, altered DNA-methylation in [white blood cells](#) after Caesarean section", *Acta Paediatrica* 2009, 98, 1096-99 (Invited commentary on pp 1082-84 in same issue of the journal).

Provided by Karolinska Institutet ([news](#) : [web](#))

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