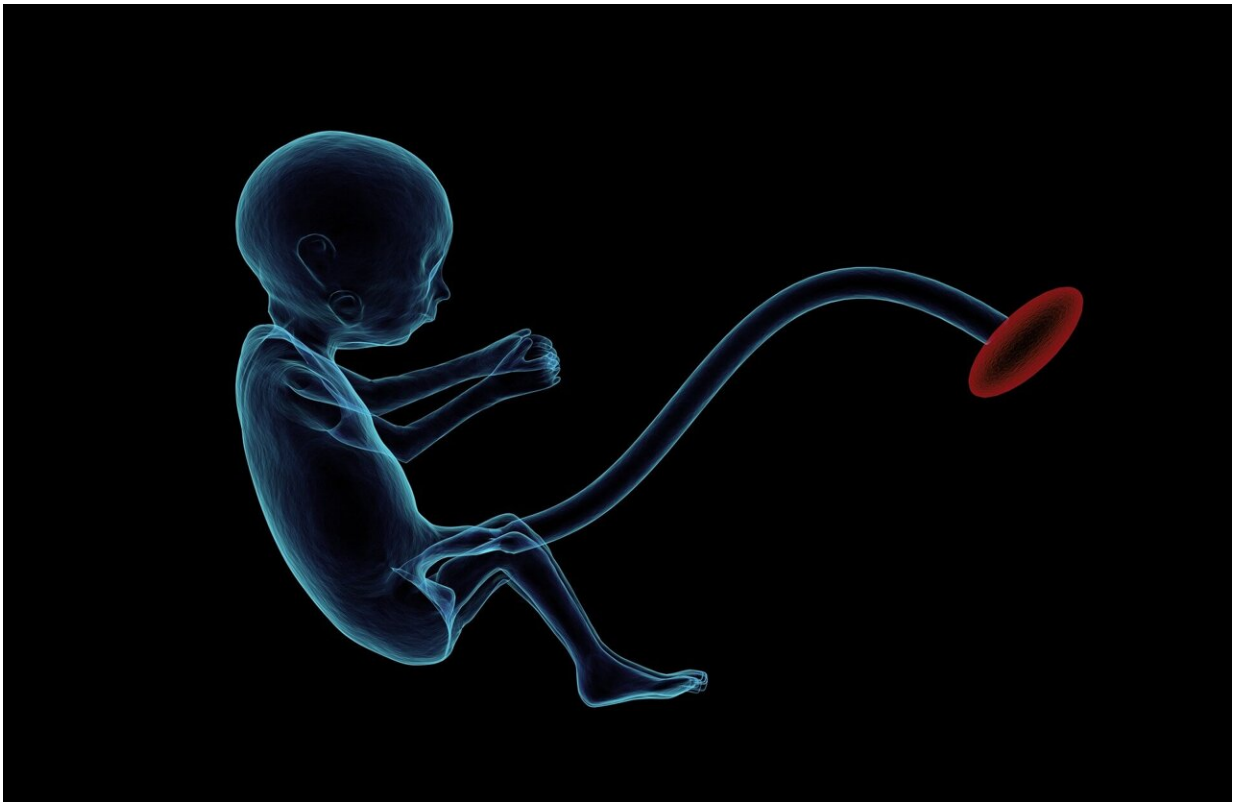


New research sheds light on genetics of placenta growth and link to preeclampsia

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New research has shed light on how genetics influences the growth of the placenta, revealing a link to risk of disease in the mother.

Scientists from the University of Exeter worked with colleagues in

Norway and Denmark to lead a large-scale [international collaboration](#) which examined placental growth in the greatest detail yet. They carried out the first ever genome-wide association study of the weight of the placenta at birth, generating a number of revelations.

The [study](#) is entitled "Genome-wide association study of placental weight identifies distinct and shared genetic influences between placental and fetal growth", and is published in *Nature Genetics*. The team concluded that faster growth of the placenta can contribute to risk of preeclampsia, and to earlier delivery of the baby.

The placenta is an organ which grows in the womb alongside the fetus, which is attached to it by the umbilical cord. The placenta provides oxygen and nutrients to the growing fetus and removes waste as the baby develops. A poorly functioning placenta is associated with pregnancy complications, and later risk of disease in the child. Despite its key role, little is yet known about how the growth of the placenta is regulated. Understanding placental growth is important, as babies with very small or large placentas are at higher risk of complications.

Professor Pål Njølstad, of the University of Bergen in Norway, who co-led the paper, said, "The placenta is such an important organ during pregnancy, providing an intricate and vital link between mother and baby. Our study has identified 40 variations in the [genetic code](#) linked to how big a placenta can grow, which improves our understanding of this vital organ in humans. Several of these genetic variations also influence the weight of the baby, but some appear to be predominantly concerned with placental growth."

The team found that where the genetic code of the fetus meant it was more likely that the placenta would grow bigger, there was a higher risk of pre-eclampsia in the mother. This could be because the placenta grows too fast, which can upset the balance between the baby's demand

for resources and how much the mother is able to provide, which can be a factor in pre-eclampsia that occurs later in pregnancy.

Professor Rachel Freathy, of the University of Exeter Medical School, is a co-lead on the paper. She said, "Pre-eclampsia is a condition that may develop in pregnancy, which causes high blood pressure. Some of the mother's organs, such as the kidneys and liver, stop working properly."

"Detecting it early is essential to avoid severe health problems for mother and baby, yet how preeclampsia develops isn't fully understood. Our study suggests that faster growth of the placenta contributes to a higher risk of preeclampsia in the mother. It seems specific to placenta growth because we did not find the same risk when we looked at the genetics of baby weight."

Faster-growing placenta was also linked to shorter pregnancy. Senior researcher, group leader Bjarke Feenstra, of Copenhagen University Hospital and Statens Serum Institut, Denmark, who also co-led the study, said, "We found that babies with genetic code for a bigger placenta were more likely to be born earlier, which underscores the importance of investigating placental biology in studies of pregnancy duration and the timing of delivery."

One key finding from the study related to insulin, which regulates blood sugar. The fetus produces insulin in response to glucose from the mother, which acts as a growth factor. The team found this insulin is also linked to the growth of the placenta, which helps to explain why placentas tend to be large in pregnancies where the mother has high blood glucose due to diabetes.

"While this is a great first step," said Professor Stefan Johansson, also co-lead at the University of Bergen, "the final weight of a placenta can only tell us a limited amount about its function. Further studies are needed to

examine the shape and development of placenta over the course of pregnancy. Our work is just the starting point for future research which could help us understand far more about the [placenta](#)'s role in the growth of the baby and risk of [pregnancy](#) complications."

The study involved wider collaboration including scientists from Australia, Canada, the US and elsewhere in Europe.

More information: Genome-wide association study of placental weight identifies distinct and shared genetic influences between placental and fetal growth, *Nature Genetics* (2023). [DOI: 10.1038/s41588-023-01520-w](#) , www.nature.com/articles/s41588-023-01520-w

Provided by University of Exeter

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