

# Research in sheep suggests possible early test for fetal heart health

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Changes in heart rate, due to low oxygen conditions, experienced by the fetus during pregnancy, could be used to predict the future heart health of babies, shows research published in the *Journal of Physiology* today.

Previous research has shown that sustained low levels of [oxygen](#) (called chronic hypoxia) during [pregnancy](#) significantly impair the growth of the fetus, leading to a condition known as intrauterine growth restriction (IUGR). Chronic hypoxia during pregnancy can also impair the development of key organs, imposing consequences for life-time health risks, such as an increased [heart](#) disease risk.

The main causes of low oxygen during [fetal development](#) are complications with the placenta. Researchers at the University of Cambridge and the University of Washington led by Dino Giussani and Martin Frasch modelled such conditions during pregnancy by placing pregnant sheep in an environment with lower than normal oxygenation, similar to experiencing high altitude. They then looked at the fetal heart separated from any influences of the rest of the body, as a way to see if the heart shows any sign of "remembering" the effects of lower than normal oxygen that was experienced in the womb.

The way that they determined this was by looking at something called [heart rate](#) variability, which refers to changes in heart rate that normally occur in our hearts. Analysis of the patterns of these changes in heart rate were able to tell them if the hearts of the fetuses were impacted in the long term.

This research may have important clinical implications. If babies from complicated pregnancies are identified to have abnormal [fetal heart](#) rate patterns, then doctors could follow the development of these children more closely to better protect against any future risk of heart disease.

Martin Frasch, first author on the study said:

"We are excited about these results and the ability it may give clinicians to assess in a new way the hearts of kids who don't show symptoms, who may have underlying heart problems. A good example of this would be kids in Brazil whose mothers were infected with the Zika virus. While they may not have symptoms, they may still actually have important problems with their hearts that we should be addressing."

**More information:** Martin G. Frasch et al, First evidence that intrinsic fetal heart rate variability exists and is affected by hypoxic pregnancy, *The Journal of Physiology* (2019). [DOI: 10.1113/JP278773](https://doi.org/10.1113/JP278773)

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