Statins may shield unborn babies from mother's stress, study suggests

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Statins could protect the hearts of babies in the womb from the adverse effects of their mother's stress, research suggests.

Scientists have discovered that the widely-prescribed drugs help to counteract the negative impact of stress hormones on fetal growth and heart development in mice.

The therapy could lower the chances of babies being born underweight and reduce their risk of health problems in later life, including heart disease, researchers say.

Further studies are needed to assess the long-term effects of statins in

pregnancy, but the drugs are already used occasionally in pregnant women and should be suitable for clinical trials, the team says.

Babies that are exposed to excessive stress hormones in the womb are often born underweight and have a greater risk of heart disease in later life.

Normally, the unborn baby is protected by a key enzyme produced by the placenta that breaks down stress hormones and greatly limits the amount of active hormones that reach the baby's blood supply.

When the expectant mother is stressed, they produce less of this enzyme and the baby is less well protected.

Scientists at the University of Edinburgh studied mice that cannot produce the enzyme as a model of maternal stress.

They found that stress hormones stop the placenta from developing normal blood vessels, which cuts back the blood supply to the growing fetus.

The developing fetus does not grow to full size as a result, and its heart function does not develop normally.

Treating the mother with a type of statin triggers production of a molecule called VEGF, which stimulates the development of blood vessels in the placenta.

By re-establishing the blood supply, the treatment promotes normal development of the heart and helps the baby to grow to a healthy birthweight, the team showed.

Around 2.5 million people in the UK take statins to lower high

cholesterol.

The study is published in the journal *Proceedings of the National Academy of Sciences* and was funded by the Wellcome Trust. The research also received funding from the Raine Medical Research Foundation, University of Western Australia.

Professor Megan Holmes, of the University of Edinburgh's British Heart Foundation Centre for Cardiovascular Sciences, said: "These are very exciting results suggesting that there may finally be a potential therapy for women whose placenta is unable to maintain the normal growth of her baby.

"At present there is no treatment and babies may be born prematurely or small, and will be at greater risk of developing cardiovascular disease, diabetes and even psychiatric disorders later in life. Although more work needs to be done to show statins are safe in human pregnancy, these results show a new way forward for the major unmet need of fetal growth retardation."

Professor Jeremy Pearson, Associate Medical Director at the British Heart Foundation, said: "Low birthweight has been associated with maternal stress, and babies with low birthweights may be more prone to cardiovascular complications later in life.

"In this study the researchers have discovered that a drug called Pravastatin may counteract the consequences of increased levels of the stress hormone corticosterone within the placentas of mice. How Pravastatin counteracts the stress hormone is not yet understood, therefore more research is needed to see whether the drug will have the same effect in humans."

More information: Pravastatin ameliorates placental vascular defects,

fetal growth, and cardiac function in a model of glucocorticoid excess, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1520356113