

Scientists identify protein which could improve treatments for recurrent miscarriages

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Scientists at the University of Sheffield have identified a protein, involved in the development of the human placenta, may also help embryos implant in the womb - something which could improve treatments for recurrent miscarriages and pre-eclampsia.

The pioneering study shows that a protein called Syncytin-1, which was the result of a viral infection of our [primate ancestors](#) 25 million years ago, is first secreted on the surface of a developing embryo even before it implants in the womb.

This means the protein is likely to play a major role in helping embryos stick to the womb as well as the formation of the placenta.

This fundamental understanding of the earliest stages of [human embryo development](#) is crucial for improving current treatments for a variety of stressful complications during pregnancy such as [recurrent miscarriages](#), foetal growth restriction syndrome and pre-eclampsia - a life-threatening condition of elevated maternal blood pressure during pregnancy.

Professor Harry Moore, Co-Director for the University's Centre for Stem Cell Biology and lead author of the study, said: "Recurrent miscarriages, foetal growth restriction syndrome and pre-eclampsia are all significant and very stressful complications of pregnancy.

"Eventually we may be able to develop blood tests based on our results to identify pregnancies that might be at risk and also develop appropriate therapies.

"There is a lot on the news about the Zika virus infection at the moment and its devastating effects on foetal development but not all [viral infections](#) are necessarily as disastrous. "

He added: "Amazingly the Syncytin-1 gene is the result of a viral infection of our primate ancestors 25 million years ago. The viral DNA got into our ancestors genome and was passed on through heredity and the gene involved in the fusion of the virus with cells for infection was co-opted and became Syncytin-1. Without it humans probably would not have evolved."

Surprisingly scientists know much more about the processes of early embryo development in animals than they do in humans. However, [embryo development](#) and reproduction is an aspect of biology where there are fundamental differences between species.

Researchers will now investigate whether the level of Syncytin-1 secretion on the pre-implantation embryo is somehow related to outcome of pregnancy in women undergoing IVF.

"Until now we didn't know this protein was expressed so early in the embryo.

"Interestingly the Syncytin-1 protein was mainly secreted in the cells of the embryo, called polar trophoblast cells, which will first stick to the cells of the womb called endometrial epithelial cells.

"In the lab we discovered the trophoblast cells that secrete Syncytin-1 not only fuse together - which in the body will form an essential barrier

to protect the embryo - but also secrete nano-vesicles called exosomes.

"These exosomes may communicate with [cells](#) in other areas of the mother to prepare her for pregnancy. If this doesn't happen properly at the earliest stages it may cause problems throughout pregnancy."

The study is published today (Friday 13 May 2016) in the journal *Human Reproduction*.

More information: "Expression of Syncytin I (HERV-W), in the preimplantation human blastocyst, embryonic stem cells and trophoblast cells derived in vitro", by Bikem Soygur and Harry Moore. *Human Reproduction*, [DOI: 10.1093/humrep/dew097](https://doi.org/10.1093/humrep/dew097)

Provided by University of Sheffield

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