

# Researchers make breakthrough in the cause of premature birth

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(Medical Xpress) -- A significant breakthrough on why women go into labour early or develop the disease pre-eclampsia has been made by scientists. The discovery concerning the conditions which threaten the life of both the newborn baby and the mother was made by researchers at the Trinity Biomedical Sciences Institute (TBSI) at Trinity College Dublin and Coombe Women and Infants University Hospital. The findings have just been published in the *Journal of Immunology*.

Mothers who deliver their babies early or develop pre-eclampsia have been shown to have higher levels of the baby's DNA in their blood. The researchers have shown that this DNA is seen as foreign by the mother's immune system, being sensed by a protein called Toll-like receptor-9 (TLR9) which provokes an inflammatory reaction that leads to pregnancy loss and early delivery. The research has shown that this response can be blocked by drugs that target TLR9, including chloroquin – a medicine used in pregnancy for other diseases.

“Premature birth is the biggest cause of infant mortality worldwide. Why babies are born early, as defined as less than 37 weeks gestation, is not known,” explained Professor of Pathology John O'Leary at TCD and the Coombe, senior physician on the research.

“The normal job of TLR9 is to sense DNA from viruses and bacteria. In preterm [labour](#) however, where the baby's DNA enters the mother's blood, TLR9 does mischief causing early birth. Our study makes TLR9 an attractive target to stop preterm birth,” continued Professor of

Biochemistry, Luke O'Neill of the School of Biochemistry and Immunology in Trinity Biomedical Sciences Institute and senior scientist.

The work is published in the current issue of the Journal of Immunology, with Dr Andrea Scharfe Nugent, consultant obstetrician and gynaecologist at Mount Carmel Hospital, and microbiologist Dr Sinead Corr as joint lead authors. The research group, which also involves Clinical Professor of Obstetrics and Gynaecology, Sean Daly, at TCD and consultant in maternal foetal medicine at the Coombe, and obstetrical clinical lead, are exploring the prospect of developing the discovery for treating women at risk of preterm birth or pre-eclampsia. The research was funded by Science Foundation Ireland and the Friends of the Coombe Hospital.

“This work is an excellent example of Trinity scientists working with clinical colleagues on important medical problems,” concluded Professor O'Neill who is also academic director of the newly opened Trinity [Biomedical Sciences](#) Institute.

**More information:** TLR9 Provokes Inflammation in Response to Fetal DNA: Mechanism for Fetal Loss in Preterm Birth and Preeclampsia. Scharfe-Nugent A, Corr SC, Carpenter SB, Keogh L, Doyle B, Martin C, Fitzgerald KA, Daly S, O'Leary JJ, O'Neill LA. *J Immunol.* 2012 Jun 1;188(11):5706-12.  
[www.ncbi.nlm.nih.gov/pubmed/22544937](http://www.ncbi.nlm.nih.gov/pubmed/22544937)

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