

Toll-like receptor 3 expression and activation at the maternal-fetal interface in pregnancy

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Aims

In pregnancy, maternal and fetal cells directly interact at two interfaces; at the syncytium layer covering all fetal cells in the placenta, and at the outer uterine wall layer called the decidua. The fetal cells, the trophoblasts, are shown to broadly express toll-like receptors (TLRs). Preeclampsia is an inflammatory pregnancy disorder and abnormal TLR3 expression at the maternal-fetal interface indicates involvement in disease development. We aimed to characterise TLR3 expression and activation in placenta and decidua of normal and pre-eclamptic pregnancies.

Methods

Immunohistochemistry was performed to detect TLR3 expression in placental and decidual tissue from normal (n=13) and pre-eclamptic pregnancies (n=29). Functional response to TLR3 ligands polyinosinic-polycytidylic acid (poly I:C) and Riboxol was studied in the trophoblast cell line SGHPL-5 and cultured placental and decidual explants isolated from term placentas. Interleukin (IL-8 and IL-6) production was measured by ELISA.

Results

TLR3 was strongly expressed by trophoblasts in the placental syncytium layer. Placental explants and trophoblasts stimulated with Riboxol produced significantly higher levels of IL-6 and IL-8, and trophoblasts responded to poly I:C by increased IL-8. In the decidua, TLR3 was selectively expressed by maternal macrophages and not fetal trophoblasts. Decidual explants responded to Riboxol with significantly increased IL-6 and IL-8 production. TLR3 expression levels will be quantified and compared in normal and in pre-eclamptic pregnancies.

Conclusion

Functional TLR3 was expressed at both sites of direct maternal-fetal interaction in pregnancy; by fetal trophoblasts in the placental syncytium and by maternal macrophages in decidua. This indicates a role for TLR3 in the crucial immune interaction between fetal cells and the maternal immune system in pregnancy. ■

Conflict of interest statement

The authors declare no conflict of interest.

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