

Molecular features of the human endometrium and placenta with special reference to unexplained infertility, recurrent miscarriage and pre-eclampsia

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Annales Universitatis Turkuensis, Painosalama Oy 2003.

Abstract

Abnormal feto-maternal interaction is believed to lead to infertility, recurrent miscarriages and pre-eclampsia. Abnormally shallow trophoblast invasion has been reported in pre-eclampsia and miscarriages, and it has been suggested that some cases of unexplained infertility are due to impaired endometrial receptivity for embryonic implantation. At present, the regulation of endometrial receptivity and trophoblasts invasion remains largely unknown.

The present study was undertaken to investigate the gene expression of collagens and proteolytic enzymes in the human endometrium during the menstrual cycle in women with normal fertility, and in the midsecretory-phase endometrium of patients with unexplained infertility and recurrent miscarriage. Northern blot analysis showed that the gene expression of collagen type I, TIMP-3 and cathepsins H and K is dependent on the phase of the cycle. The results also suggest altered ECM turnover in the midsecretory-phase endometrium of patients with fertility disorders.

In addition, possible mediators of trophoblast invasion were searched for by studying the expression of a panel of adhesive molecules in the feto-maternal interface in first and third trimester pregnancies, and pre-eclampsia was used as a model of impaired trophoblast function. The results did not suggest a role in trophoblast invasion for any of the molecules studied, but syndecan-1, CD73 and CLA-1 may have other functions in trophoblasts. Furthermore, the expression of adhesive molecules in the placental bed is unchanged but the expression of syndecan-1 is changed in villous placenta in pre-eclampsia.

In conclusion, substances participating in ECM turnover play a role in the regulation of endometrial receptivity for trophoblast invasion. The roles of syndecan-1, CD73 and CLA-1 in trophoblasts remain to be determined.

Keywords: implantation, infertility, recurrent miscarriage, pre-eclampsia, endometrium, placental bed, trophoblast