

## MUC1 expression is elevated in severe preeclamptic placentas and suppresses trophoblast cell invasion via $\beta$ 1-integrin signaling

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### ABSTRACT

**Context:** Preeclampsia is a pregnancy-specific disorder and is featured by insufficient extravillous trophoblast (EVT) invasion. We have previously shown that MUC1 expression in human placenta increases with the gestational age and inhibits choriocarcinoma cell invasion.

**Objective:** Here, we studied whether MUC1 expression in preeclamptic placentas is dysregulated and the mechanism of EVT invasion regulated by MUC1.

**Design:** MUC1 expression in severe preeclamptic placentas and the gestational age-matched control placentas was analyzed by real-time RT-PCR, Western blot analysis, and immunohistochemistry. The effects of MUC1 expression on cell-matrix adhesion, invasion, and cell signaling were studied in HTR8/SVneo EVT cells.

**Results:** We found that *MUC1* mRNA and MUC1 protein were significantly upregulated in severe preeclamptic placentas when compared with the gestational age-matched control placentas. Immunohistochemical analyses showed increased expression of MUC1 in the syncytiotrophoblast and EVT of severe preeclamptic placentas. In addition, MUC1 overexpression suppressed cell-matrix adhesion and invasion of EVT cells. Importantly, our

data showed that MUC1 overexpression inhibited  $\beta$ 1-integrin activity and phosphorylation of focal adhesion kinase (FAK), whereas the surface expression of  $\beta$ 1-integrin was not significantly changed.

**Conclusions:** Our findings suggest that MUC1 is overexpressed in severe preeclamptic placentas and that MUC1 overexpression suppresses EVT invasion mainly via modulating  $\beta$ 1-integrin signaling.

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