

Titel	Monoamine transporters in female human reproduction.
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The present study explored the gene and protein expression of the monoamine transporters in human endometrium throughout the menstrual cycle, in early decidua and in placentas from normal as well as preeclamptic pregnancies using in-situ hybridization, real time-PCR, immunohistochemistry and primary tissue cultures. Four distinguishable patterns were observed in the endometrium over the menstrual cycle: (1) epithelial expression of norepinephrine transporter (NET) mRNA, (2) Stromal co-expression of vesicular monoamine transporter 2 (VMAT2) and plasma membrane monoamine transporter (PMAT) mRNAs with maximal intensity in the proliferative phase; (3) increasing epithelial expression of VMAT2 mRNA with a maximum in the late secretory phase; (4) stromal expression of extra-neuronal monoamine transporter (EMT) mRNA with a peak in the early secretory phase. The presence of functional EMT and VMAT2 transporter proteins throughout the menstrual cycle was shown by uptake of radiolabelled histamine. A similar expression pattern of monoamine transporters was seen in normal and preeclamptic placentas. In particular, NET mRNA was detected in the chorionic and anchoring villi while EMT mRNA was expressed in scattered cells in placental vessels as well as in intralobular septa cells. Serotonin transporter (SERT) mRNA was mainly detected in the chorionic villi. VMAT2 mRNA was detected in the deeper layers of the placenta bed biopsies in trophoblast cells. A small number of cells in the intima layer of some placental vessels showed mRNA expression of the organic cation transporters 1 and 2 (OCT1 and OCT2). Although the expression pattern was similar, a significantly lower gene expression of NET and EMT was found in placentas obtained from preeclamptic versus normal pregnancies. Our results suggest that monoamine transports may have specific functions in female human reproduction by maintaining adequate levels of extra cellular monoamines. Their presence and dynamic expression suggests an important role during the menstrual cycle and pregnancy. Moreover a defective gene expression or function of the monoamine transporters might be determinant in the onset of preeclampsia and its alteration in the vascular bed. Knowledge of the regulation of monoamine metabolism in the endometrium, decidua and placenta will increase the understanding of infertility problems and may offer new pharmacological approaches to optimise assisted reproduction and treatment of preeclampsia.