Hypoxia promotes endometriosis development affecting extracellular matrix turnover.

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Context
Induction and progression of endometriosis depends on extracellular matrix (ECM) remodeling. Early lesions are avascular implants that develop in hypoxic milieu, therefore partial oxygen pressure can be an important factor contributing to the pathogenesis of endometriosis.

Objective
The aim of the study was to investigate the impact of partial oxygen pressure on the expression of genes involved in extracellular matrix remodeling and their regulatory miRNA in the endometrial cells.

Methods
Normal endometrial epithelial cells were isolated from aspiration biopsies of healthy donors. After separation of endometrial glands, primary cells were immortalized by stable transfection and clones were selected and propagated. Endometrial cell lines were incubated in the atmosphere containing 19%, 3% or 1% of oxygen (pO2/pAtm x 100%). Gene expression was evaluated by Real-time PCR using TaqMan probes after 48h and 144h of culture in hypoxia chamber.

Main Outcome Measure
Expression levels of genes involved in extracellular matrix remodeling (inhibitors of metalloproteinases) on mRNA level and their regulatory miRNA were evaluated.

Result(s)
Remarkable difference in expression was shown for all evaluated genes in moderate and deep hypoxia. Hypoxia decreases expression of metalloproteinases inhibitors unleashing activity of metalloproteinases. The influence of decreased oxygen pressure promotes matrix turnover-related pattern of gene expression.

Conclusions.
The results confirm that hypoxia have remarkable impact on physiology of epithelial endometrial cells.

Hypoxia related modulation of genes regulating matrix turnover can be an inevitable factor for lesion implantation and growth - crucial for disease development.