1) BCL6, a key oncogene, in the placenta, pre-eclampsia and **endometriosis**.
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**Abstract**

**Background:** The key oncogene B-cell lymphoma 6 (BCL6) drives malignant progression by promoting proliferation, overriding DNA damage checkpoints and blocking cell terminal differentiation. However, its functions in the placenta and the endometrium remain to be defined.

**Objective and rationale:** Recent studies provide evidence that BCL6 may play various roles in the human placenta and the endometrium. Deregulated BCL6 might be related to the pathogenesis of pre-eclampsia (PE) as well as endometriosis. In this narrative review, we aimed to summarize the current knowledge regarding the pathophysiological role of BCL6 in these two reproductive organs, discuss related molecular mechanisms, and underline associated research perspectives.

**Search methods:** We conducted a comprehensive literature search using PubMed for human, animal and cellular studies published until October 2021 in the following areas: BCL6 in the placenta, in PE and in endometriosis, in combination with its functions in proliferation, fusion, migration, invasion, differentiation, stem/progenitor cell maintenance and lineage commitment.

**Outcomes:** The data demonstrate that BCL6 is important in cell proliferation, survival, differentiation, migration and invasion of trophoblastic cells. BCL6 may have critical roles in stem/progenitor cell survival and differentiation in the placenta and the endometrium. BCL6 is aberrantly upregulated in pre-eclamptic placentas and endometriotic lesions through various mechanisms, including changes in gene transcription and mRNA translation as well as post- transcriptional/translational modifications. Importantly, increased endometrial BCL6 is considered to be a non-invasive diagnostic marker for endometriosis and a predictor for poor outcomes of IVF. These data highlight that BCL6 is crucial for placental development and endometrium homeostasis, and its upregulation is associated with the pathogenesis of PE, endometriosis and infertility.

**Wider implications:** The lesson learned from studies of the key oncogene BCL6 reinforces the notion that numerous signaling pathways and regulators are shared by tumors and reproductive organs. Their alteration may promote the progression of malignancies as well as the development of gestational and reproductive disorders.

**Keywords:** B-cell lymphoma 6; endometriosis; fusion and differentiation; infertility; inflammation; migration; placenta; pre-eclampsia; proliferation; stem and progenitor cells.