**LINC01638 promotes epithelial-to-mesenchymal transition in endometriosis epithelial cells by upregulating RHOB via HDAC1 suppression.**

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**Introduction/Background**

*LINC01638* is a long non-coding RNA (lncRNA) that in several cancers has been implicated in the regulation of proliferation and epithelial-to-mesenchymal transition (EMT). Given that these processes are also important in endometriosis, we investigated the role of *LINC01638* in this disease.

**Materials and Methods**

We combined expression and localization studies in patient eutopic and ectopic endometrium with functional experiments in the 12Z endometriosis epithelial cell line to investigate the role of *LINC01638* in endometriosis. We assessed the phenotype following *LINC01638* knockdown, performing proliferation, adhesion, migration and invasion assays, as well as assessing apoptosis and cell cycle changes with flow cytometry assays. To assess the relationship between *LINC01638* and HDAC1 we combined *LINC01638* knockdown with HDAC inhibition with romidepsin.

**Results**

We found that *LINC01638* is upregulated in the epithelial layer of endometriosis lesions, and that *LINC01638* knockdown in 12Z cells led to reduced proliferation, adhesion, migration and invasion. The reduction in proliferation was associated with increased p21 and p27 expression and G1 phase arrest. Further analysis of *LINC01638* control and knockdown cells revealed that a number of transcription factors associated with EMT are downregulated in the knockdown along with the cytoskeleton regulatory gene RHOB, while HDAC1 was upregulated.Chromatin immunoprecipitation analysis and HDAC1 inhibitory treatment combined with *LINC01638* knockdown indicated that *LINC01638* regulates *RHOB* expression via HDAC1 mediated promoter deacetylation. RHOB is upregulated in the epithelial layer of endometriosis lesions compared to the eutopic endometrium supporting a role in the disease.

**Conclusion**

These results indicate that *LINC01638* is an epigenetic regulator of pathogenesis of endometriosis promoting proliferation and EMT of endometriosis lesions.

**Key words**

EMT, RHOB, HDAC1