Context: microRNAs are small noncoding RNAs which regulate gene expression at the posttranscriptional level. Dysregulated expression of microRNAs has been linked to the pathogenesis of endometriosis.

Objective: In the present study, we evaluate the suitability of miR-142-3p, known to be dysregulated in endometriotic lesions, as a noninvasive serum biomarker for endometriosis. Furthermore, the functional role of miR-142-3p in this disease is evaluated in vitro using immortalized cell lines and patient-derived primary endometrial stroma cells.

Patient(s): miR-142-3p expression in the sera of patients with laparoscopically confirmed endometriosis (n=41) and control sera of patients without endometriosis (n=44) from the IVF clinic of Münster University Hospital were analyzed by qPCR.

Intervention(s): The immortalized cell lines 12Z (epithelial endometriotic), ST-T1b (endometrial stroma) and primary eutopic endometrial and ectopic stroma cells were transiently transfected using miR-142-3p precursors or appropriate control reagents, respectively.

Main Outcome Measure(s): Cell behaviour and morphology were evaluated by MTT assay, video microscopy and confocal immunofluorescence microscopy. Target gene expression and signal transduction analysis were performed by qPCR and Western blotting.

Results: miR-142-3p expression was decreased by 80% (p=0.0116) in sera of endometriosis patients compared to controls. miR-142-3p upregulation resulted in a downregulation of the predicted targets IL6ST, ITGA1, RAC1, WASL and ROCK2. In ST-T1b cells, IL-6 mediated STAT3 signaling and cell viability were significantly inhibited (p<0.05), whereas 12Z cell motility was significantly affected (p<0.05) due to changes in cytoskeletal structure.

Conclusions: Downregulation of miR-142-3p promotes the pathogenesis of endometriosis via upregulated expression of proinflammatory signaling receptors and cytoskeletal elements, which in turn may facilitate establishment of the endometriotic lesion at ectopic sites. miR-142-3p emerges as a noninvasive diagnostic marker and therapeutic target in endometriosis.