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Endometrium and Endometriosis – It is all the same from a cellular perspective

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Context Although it was proposed that peritoneal endometriosis, endometriomas and deep infiltrating endometriosis (DIE) represent three distinct entities, endometriotic glands almost always have an endometrioid appearance and resemble histologically uterine endometrial glands.
Objective To assess the phenotype of the epithelial and stromal eutopic and ectopic endometrial cells.
Methods In this immunohistochemical (IHC) study, we used for epithelial cells keratin-18, -19 (K18, K19), mucin-1 (MUC1), vimentin, and zinc finger E-box-binding homeobox 1 (ZEB1) and for stromal cells, CD90, CD10, alpha-smooth muscle actin and CD140b.
Patients All specimens were obtained by hysterectomy (uteri, n=117) or laparoscopy (n=134 patients with 156 lesions) from patients mainly suffering from pain (~60%).
Main Outcome Measures IHC was quantified by the HSCORE (0-3). Furthermore, the percentage of stained stromal cells was quantified and all stained glands in eutopic and ectopic endometrium counted.
Results No differences for K18, K19 and MUC1 between endometrium with and without endometriosis were found. In endometriotic lesions K19 and MUC1 were significantly decreased. However, the maintained expression of epithelial markers in all cells of all tissues clearly indicates no loss of the epithelial phenotype. This is further supported by the reduced presence of vimentin in the endometriotic lesions. The increase of ZEB1 especially in DIE, suggests a possible role of partial epithelial mesenchymal transition (EMT).
Eutopic endometrium without endometriosis showed a high percentage of stromal cells positive for CD140b (81%), and CD10 (67%), a moderate number of CD90 (58%) and very few ?-smooth muscle actin-positive cells (9%). These values are highly similar to cases with endometriosis, except for a significant difference between CD10-positive stromal cells in peritoneal compared to ovarian lesions.
Conclusions Although we found a partial EMT of the epithelial cells we did not observe a loss of the epithelial cell phenotype. Thus we propose, that EMT is not a main factor in endometriosis. The marker signature of eutopic and ectopic endometrial stromal cells resembles mostly mesenchymal stromal cells. Our results show clearly that the proportions of the stromal cell types in the endometrium with or without endometriosis does not differ significantly, thus suggesting that the stromal microenvironment does not contribute to the pathogenesis of endometriosis.

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