**Abstract**

**Study question:** What are the detailed endometrial tissue specific and systemic dendritic cell (DC) subset disturbances in endometriosis?

**Summary answer:** This study confirms myeloid DC (mDC) and plasmacytoid DC subsets are readily identified in endometrial tissue and shows both endometrial and circulating differences in DC populations in women with endometriosis, with disease stage-specific relationships evident locally in the endometrium.

**What is known already:** Immune factors in the uterus, the peritoneal environment and systemically are implicated in the pathogenesis and progression of both endometriosis and infertility. While there is some evidence that endometrial DC populations are altered in endometriosis, DC subset involvement in both the endometrium and peripheral blood have not been comprehensively investigated so the functional consequences have been unknown.

**Study design, size, duration:** This prospective cross-sectional cohort study compares circulating and endometrial DC populations in women of reproductive age with and without endometriosis (n = 55 and 30, respectively), wherein each participant donated samples at a single time point. Study participants were surveyed for menstrual cycle phase, American Society for Reproductive Medicine (ASRM) endometriosis disease stage and fertility status (where possible).

**Participants/materials, setting, methods:** Peripheral blood samples were processed into mononuclear cells for analysis by flow cytometry, and endometrial samples were analysed by immunohistochemistry and dissociated into single-cell suspension for flow cytometry.

**Main results and the role of chance:** In the endometrium of women with endometriosis, IRF-8+ cells were increased during the proliferative phase (P = 0.014), total DC proportions increased in the secretory phase (P = 0.038) and normal menstrual cyclical fluctuations in CD1c+ and IRF-8+ cells blunted; indicative of a consistently inflammatory tissue environment. The inflammatory changes in CD141+ and IRF-8+ populations in the endometrium of women with endometriosis were particularly evident in more advanced ASRM stages of the disease (respective P-values 0.032 and 0.045). There was also evidence of systemic inflammation in women with endometriosis, with increased circulating CD141+ mDC proportions (overall P = 0.040, secretory phase P = 0.021).

**Large scale data:** N/A.

**Limitations, reasons for caution:** As is common in this type of study, one of the main limitations was small sample numbers, particularly during the menstrual phase of the cycle.

**Wider implications of the findings:** Further phenotyping of local and circulating immune cell subtypes is critical to improving understanding of endometriosis pathogenesis and immune contributions to infertility associated with the disease.