**Supporting Information**

**Materials and Methods S1**

*ADSCs isolation and culture*

Rats were sacrificed to obtain intraperitoneal adipose tissue. The fresh fat specimen was surgically excised and chopped by sterilized scissors following washed by phosphate-buffered saline (PBS) containing 1% penicillin–streptomycin. The minced adipose were digested with 0.2% type I collagenase (Gibco, USA) and then incubated at 37°C until it became chyloidal. The suspension was then neutralized and centrifuged at 1000 *g* for 5 min. The cell pellet was then resuspended and cultured in Dulbecco’s modified Eagle’s medium/F12 (DMEM/F12) medium with 10% fetal bovine serum (FBS) (Gibco) and 1% penicillin–gentamicin. Cells were seeded in cell culture plate with a density of 106 cells/ml and then maintained at 37°C incubator. The passage was conducted according to cell status and density. ADSCs were passaged three times and then used for the following experiments.

*Differentiation properties of human ADSCs*

Differentiation medium containing 1 μM dexamethasone, 0.5 mM 3-isobutyl-1-methylxanthine, 60 μM indomethacin, 10 μg/ml insulin and 0.5 μM hydrocortisone was used for the experiments. Oil Red O (Sigma-Aldrich, St. Louis, MO, USA) staining was perform to evaluate adipogenic differentiation. ADSCs were wash twice with PBS, placed in 4% paraformaldehyde and put into plates for 15 min at room temperature. Then, 60% 2-propanol solution were added to cell culture plate for 10 min. Cells were staining with prepared Oil Red O solution for 30 min at room temperature. Finally, cells were rinsed with PBS three times to remove non-specific staining. Stained cells were examined under an Olympus microscope. Following the Chondrogenesis Differentiation kit manual (Cyagen Biosciences, Inc.), ADSCs were induced for 15 days using chondrogenesis differentiation medium and then the cells were rinsed with PBS and stained with 1% Alcian blue for 15 min at room temperature.

*Masson trichrome staining*

The degree of endometrial fibrosis was detected by Masson trichrome staining. Tissues were fixed and embedded into paraffin. Masson (Beijing Leagene Biotechnology Co., Ltd) staining was used to observe changes in tissue morphology and collagen fibre in the endometrium. An Olympus BX43 inverted phase contrast microscope was used to observe pathological changes in endometrium in different groups. Each image was investigated in five fields and interstitial fibrosis was analyzed using ImageJ software.

*Immunofluorescence staining*

Immunofluorescence studies were carried out to detect the co-localization of GFP-positive ADSCs. Immunofluorescence staining was used to identify whether changes in the endometrial glandular epithelial cells and endometrial stromal cells were associated with ADSCs differentiation. For immunofluorescence, bilateral uterine horns isolated from mice were washed with cold PBS for several time, and tissue were embedded in optimal cutting temperature compound (Leica) following fixation with 4% formaldehyde solution. Tissues underwent regular sectioning (4 μm) and immunofluorescence staining. The primary antibodies used in the experiment were as follow: CK7 (Abcam Ltd, Cambridge, UK)and CK19 (NOVUS Ltd, Colorado, USA). In addition targets CK31 (Abcam Ltd, Cambridge, UK) and fibronectin (Abcam Ltd, Cambridge, UK) used to identify stromal cells were chosen. Co-expression of GFP was observed simultaneously. Fluorescein-labelled secondary antibodies (Life Technologies, 1:300) were applied for 1 h at room temperature.