

## CHAPTER 11

### ESTROGEN AND PROGESTERONE REGULATED ENDOMETRIAL GENES

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#### **What is the role of endometrium during pregnancy?**

The most important roles of the endometrium are to ensure implantation of the blastocyst and support the pregnancy. The endometrium is ready for blastocyst implantation during the implantation window. The mature endometrium degenerates and then starts to prepare for next implantation. Both implantation and menstruation are controlled by sex steroids and both are considered to inflammatory events and accompanied by increased expression of inflammatory mediators (1).

#### **What are the role of estrogen and progesterone during menstrual cycle?**

The endometrium consists of a basal and a functional layer on which estrogen, progesterone, and steroids have morphological effects. Blastocyst firstly contacts the luminal epithelium of the functional layer. Estrogen is a dominant hormone during the proliferative phase and regulates endometrial regeneration following menstruation. The secretory phase commences after proliferation ceases and during the onset of endometrial differentiation after ovulation. Progesterone levels rise in the mid-secretory phase in which implantation may occur. In the stromal cells decidualization begins and spiral arteries become different in the late-secretory phase. If a succesful implantation does not occur, the corpus luteum begins to regress and progesterone production reduces. Consequently, menstruation begins following focal tissue necrosis (2).

#### **How estrogen works?**

The effects of estrogen on endometrial tissue are controlled by the estrogen receptor (ER), a hormone-regulated transcription factor. Two ER genes, *Esr1* and *Esr2*, with distinct loci encode ER receptors  $\alpha$  and  $\beta$ . Both receptors bind estrogens and regulate other similar genes. As reported using general ER models, the agonist binds to the receptor that then interacts with the target genes through DNA regulatory sequences. The ligand–ER complex formed then recruits tran-

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