CHAPTER 18

GENETIC MARKERS OF ENDOMETRIAL RECEPTIVITY

Banuhan SAHIN and Bugra SAHIN

What is endometrial receptivity?

Endometrial receptivity is a period of endometrial maturation that provides the embryo with the opportunity attaching to endometrial epithelial cells, invading and developing in the endometrial stroma and vasculature for a healthy pregnancy (1).

When does the endometrium become optimum recipient?

The endometrium becomes receptive environment with actions of the steroid hormones, estradiol (E) and especially progesterone (P) in the window of implantation (WOI) that extends 3–6 days within the mid-luteal phase of menstrual period in most healthy women (1). In natural cycles, blood luteinize hormone (LH) peak has been used as the reference, considering the WOI is opened between LH+5 and LH+9 (2).

What happens when the WOI limited, shifted or defected?

Absence of implantation (infertility), insufficient implantation (miscarriage) or abnormal implantation and invasion (e.g., pre-eclampsia) occur in some inflammatory or immunological conditions due to failed expression of estradiol receptor (ER) and progesterone receptor (PR) (2).

What is the role of progesterone?

Progesterone provides a synchrony between endometrium, embryo and corpus luteum. It has a pivotal role in the establishment and maintenance of a healthy pregnancy due to its anti-inflammatory and immuno-tolerance capability (3). Using anti-progestins promote struggles with proper endometrial function and can cause pregnancy loss. Even though the embryos are fully competent, an early rise in P expression during ovarian stimulation causes unsuccessful transfer in the cycle (4). P dominancy and P-regulated genes are responsible for the repressor of estrogen activity by down-regulation of ERs in the endometrial epithelium.

What are the markers of endometrial proliferation?

Proliferating cell nuclear antibody (PCNA), Marker of KI67 (MKI67), Cyclin A2 (CCNA2), Mini-chromosome maintenance 2 (MCM2), and SMAD3 are proliferative markers of developing endometrium (12).

What are the cytokine markers of endometrial receptivity?

Interleukin 11 (IL11), Leukaemia inhibitory factor (LIF), Chemokine (C-X3-C motif) ligand 1 (CX3CL1), Chemokine (C-C motif) ligand 4 (CCL4), Chemokine (C-C motif) ligand 19 (CCL19) and Interleukin 15 (IL15) (12).

What are the adhesion markers of endometrial receptivity?

E-cadherin (CDH1), Protocadherin-1 (PCDH1), Trophinin (TRO), Tastin (TROAP), Bystin (BYSL), Integrin α5 (ITGA5), Integrin β3 (ITGB3) and Integrin β1 (ITGB1) (12).

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