ENDOMETRIAL CELL

Cells composing an inner layer of the uterine lining.

♀ Reproductive cells ♂ Female

About Endometrial cell

Endometrial cells form an inner layer of the uterine lining (endometrium) and participate in the functions of the uterus. The number of cell layers depends on the woman’s current cycle of the menstrual cycle. The epithelial stromal cells are located in the upper layer of the endometrium, and below are a layer of simple tubular glands (glandulae uterinae).

Function

Endometrial cells play a significant role in the state of endometrium (Pic. 1). The functional layer is adjacent to the uterine cavity. This layer is built up after the end of menstruation during the first part of the previous menstrual cycle. Proliferation (growth or production of the cells) is induced by estrogen (follicular phase of menstrual cycle), and later changes in this layer are engendered by progesterone from the corpus luteum (luteal phase). It is adapted to provide an optimum environment for the implantation and growth of the embryo. This layer is completely shed during menstruation.

The basal layer, adjacent to the myometrium (uterine muscular layer) and below the functional layer, is not shed at any time during the menstrual cycle, and from it the functional layer develops.

In the absence of progesterone, the arteries supplying blood to the functional layer constrict, so that cells in that layer become ischaemic and die, leading to menstruation.

Histological structure

- Endometrial stromal cells

Epithelial stromal cells represent a major cellular component of human uterine endometrium (endometrial stromal cells) that is subject to tight hormonal regulation.

Endometrial stromal cells are the connective tissue cells of the endometrium that are fibroblastic in appearance. The human endometrium is a highly dynamic tissue undergoing major histological changes during the menstrual cycle under the coordinated action of sexual hormones (Pic. 2). Estrogen dominates the proliferative phase of the menstrual cycle, while the post-ovulatory rise of ovarian progesterone drives the differentiation of human endometrial stromal cells (HESC) adjacent to spiral arteries.

This process, known as pre-decidualization, is critical for fetal trophoblast (an outside cell layer of embryo) invasion and placenta formation and occurs independently of an implanting blastocyst (a structure formed in the early development of mammals). The success of human pregnancy strongly depends on embryo quality and the physiological state of the endometrium. To prepare the uterus for embryo implantation and pregnancy, the endometrium undergoes a decidualization (see below). During this process, the endometrial epithelium, blood vessels, and stroma are transformed into a specialized tissue, called decidua.
Decidual stromal cells

The human decidua is a specialized tissue characterized by embryo-receptive properties thus it enables the recognition of embryo. Decidua is formed during the secretory phase of menstrual cycle from endometrium. The decidua is composed of glands, immune cells, blood and lymph vessels, and decidual stromal cells (DSCs). DSCs acquire specific functions related to recognition, selection, and acceptance of the allogeneic embryo (originating from the same species), as well as to development of maternal immune tolerance.

Decidualization, the differentiation process of maternal uterine stromal cells into secretory decidual cells, is a prerequisite for successful implantation and progression of pregnancy. The process initiates as a result of the elevated levels of ovarian hormones - oestrogen and progesterone - independent of the presence of an implanting blastocyst. It causes a gradual and profound alteration in gene expression (by which genetic instructions are used to synthesize gene products), cellular functions, and tissue remodelling until the complete formation of a placenta during pregnancy.

Pathological conditions

Through cell-cell contacts and/or paracrine mechanisms (cell’s signal to induce changes in nearby cells), stromal cells play a significant role in the malignant transformation (i.e. can spread to other parts of the body) of epithelial cells.

In the case of excessive proliferation of the cells of endometrium, the condition is referred to endometrial hyperplasia. Endometrial hyperplasia is a significant risk factor for the development or even co-existence of endometrial cancer, so careful monitoring and treatment of women with this disorder is essential. Endometrial cancer arises from the lining of the uterus. It is the result of the abnormal growth of cells that have the ability to invade or spread to other parts of the body.

Related diseases

endometriosis

Find more about related issues

Diagnoses

Anorexia Nervosa
An eating disorder characterized by the maintenance of a body weight below average, fear of gaining weight, and a distorted body image. Learn more at: www.fertilitypedia.org/therapy/diag/anorexia-nervosa

Endometrial polyp
The finger like overgrowths attached to the inner wall of the uterus that extend into the uterine cavity which are made of endometrial tissue. Learn more at: www.fertilitypedia.org/therapy/diag/endometrial-polyp

Endometriosis
A state in which pieces of the tissue alike to the lining of the uterus (endometrium) grow in other parts of the body. Learn more at: www.fertilitypedia.org/therapy/diag/endometriosis

Thyroid disorders
A medical condition impairing the function of the thyroid. Learn more at: www.fertilitypedia.org/therapy/diag/thyroid-disorders

Adenomyosis
Medical condition characterized by the presence of ectopic endometrial tissue within the myometrium. Learn more at: www.fertilitypedia.org/therapy/diag/adenomyosis
Asherman's syndrome
A medical condition, where the walls of the uterus stick to one another due to bands of scar tissue.
Learn more at: www.fertililtypedia.org/therapy/diag/asherman-s-syndrome

Uterine malformations
A type of female genital malformation resulting from an abnormal development of the Müllerian duct(s) during embryogenesis.
Learn more at: www.fertililtypedia.org/therapy/diag/uterine-malformations

Uterus septus
A form of a congenital malformation where the uterine cavity is partitioned by a longitudinal septum. It is one of Müllerian duct anomalies.
Learn more at: www.fertililtypedia.org/therapy/diag/uterus-septus

Uterus duplex
Congenital uterine malformation where both Müllerian ducts develop but fail to fuse, thus the woman has a "double uterus".
Learn more at: www.fertililtypedia.org/therapy/diag/uterus-duplex

Uterus subseptus
A form of a congenital malformation where the uterus is partially divided by a longitudinal septum. It is one of Müllerian duct anomalies.
Learn more at: www.fertililtypedia.org/therapy/diag/uterus-subseptus

Endometrial cancer
Cancer that arises from the endometrium, the lining of the uterus.
Learn more at: www.fertililtypedia.org/therapy/diag/endometrial-cancer

Oligomenorrhea
Light or infrequent menstrual flow at intervals of 39 days to 6 months or 5–7 cycles in a year.
Learn more at: www.fertililtypedia.org/therapy/diag/oligomenorrhea

 Organs

Uterus
The uterus is the largest and major organ of the female reproductive tract that is the site of fetal growth and is hormonally responsive
Learn more at: www.fertililtypedia.org/edu/organs/uterus

Reproductive functions

Implantation
The very early stage of pregnancy at which the embryo adheres to the wall of the uterus.
Learn more at: www.fertililtypedia.org/edu/reproductive-functions/implantation

Gallery
Sources

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"Human Endometrial Stromal Cells Are Highly Permissive To Productive Infection by Zika Virus" [https://www.nature.com/articles/srep44286] — by Pagani et al. licensed under CC BY 4.0

"Human Decidual Stromal Cells as a Component of the Implantation Niche and a Modulator of Maternal Immunity" [https://www.hindawi.com/journals/jip/2016/8689436/] — by Vinketova et al. licensed under CC BY 4.0

"Evaluation of human first trimester decidual and telomerase-transformed endometrial stromal cells as model systems of in vitro decidualization" [https://ejournals.ub.uni-heidelberg.de/index.php/bmc] — by Saieh et al. licensed under CC BY 2.0

"Microarray Analysis on Gene Regulation by Estrogen, Progesterone and Tamoxifen in Human Endometrial Stromal Cells" [http://www.mdpi.com/1422-0067/16/3/5864] — by Ren et al. licensed under CC BY 4.0

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