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Question

Write a short note on IMPLANTATION.

Answers

The endometrium structure below is favorable for an implantation of the blastocyst. It undergoes structural alterations that are regulated by sexual hormones. This cycle can be divided into three phases: menstrual, follicular and luteinic. Each is characterized by its own histological appearance of the endometrium, especially the glandular epithelium.

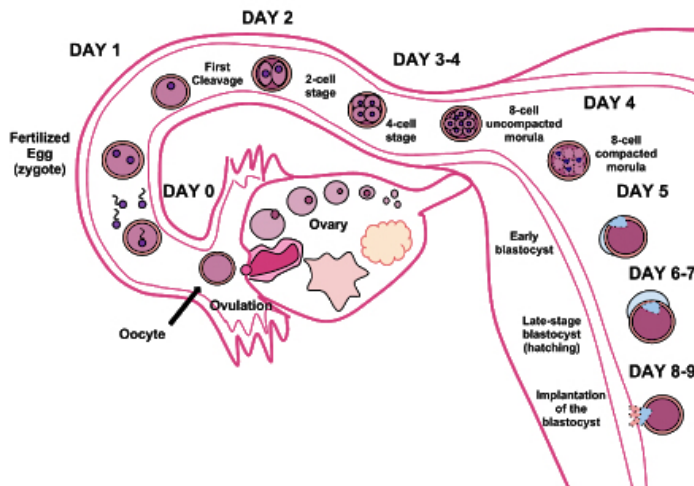
The implantation stage begins with the apposition of the blastocyst at the uterine mucosa that normally is only formed in a region of the uterine wall.

An implantation of the blastocyst outside this zone means an extra-uterine pregnancy with serious consequences for the person's health. The implantation stages of the blastocyst in the uterine endometrium can be seen as taking place in three phases: apposition, adhesion and the embedding in the endometrium. The apposition can only occur during a certain time period within the course of the cycle, the so-called "implantation window". The apposition is connected with the maturation of the endometrium. As soon as the adhesion on the endometrium is complete, the cells that lie on the periphery of the blastocyst - the trophoblast - differentiate into two cell types: the syncytiotrophoblast (ST, on the outside) and the cytotrophoblast (CT, on the inside). Through their lytic activity the ST cells erode numerous structures of the endometrium and induce the decidual reaction. This process leads to the embedding of the blastocyst into the endometrium, whereby at this time it is completely surrounded by ST cells. During the second week extra-cytoplasmatic vacuoles appear in the ST. They combine into lacunae that later become filled with maternal blood, which comes from vessels eroded by the lytic ST activity. The primitive utero-placental circulatory system is thereby engendered.

The stages of the implantation result in a cascade of molecular mechanisms that cause interactions between the trophoblast cells, on the one hand, and the cells and the extra-cellular matrix of the uterine mucosa, on the other. These interactions begin already at the moment the blastocyst hatches (preimplantation signals), changing the structural and functional properties of the uterus. These also promote the movement of the blastocyst in the direction of the implantation location and its modification in order to make the implantation easier. The interactions between the blastocyst and the uterine epithelium make sure the embryo has the right orientation as well as its adhesion to the uterine wall. The interactions between the blastocyst and the endometrium regulate the invasion of the trophoblast and the embedding of the blastocyst into the endometrium.

Several factors can lead to an abnormal implantation. In addition to the normal implantation zone there are a variety of locations, both within and outside the uterus, where the blastocyst can embed itself (EUG = extra-uterine gravidity). Inside the uterus an implantation in the lower part leads to a placenta praevia. It forms in the cervix uteri and prevents a normal birth. Its detachment can also lead to serious clinical complications (hemorrhages).

With contraceptive methods one distinguishes between mechanical and chemical ones. Mechanical methods (spiral IUD's) have a double function: on the one hand, they work towards preventing an embedding of the blastocyst in the endometrium, and, on the other, they immobilize the sperm cells. With chemical methods, which are meant to hinder implantation or early embryonic development, either high hormone dosages ("morning after pill") or receptor antagonists (RU 486) are prescribed.



Possible signs of implantation

- Bleeding
- Cramps
- Discharge
- Bloating
- Tender breasts
- Nausea
- Headaches
- Mood swings
- Implantation dip