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Course: Physiology

Question

Write a short note on IMPLANTATION.

Answer

The term "implantation" is used to describe process of attachment and invasion of the uterus endometrium by the blastocyst (conceptus) in placental animals. In humans, this process begins at the end of week 1, with most successful human pregnancies the conceptus implants 8 to 10 days after ovulation, and early pregnancy loss increases with later implantation. The implantation process continues through the second week of development.

The initial phase of the implantation process is "adplantation". This first phase requires the newly hatched blastocyst to loosely adhere to the endometrial epithelium, often "rolling" to the eventual site of implantation where it is firmly adhered. This process requires both the blastocyst adhesion interaction with the endometrium during the "receptive window".

Subsequent development of the placenta allows maternal support of embryonic and fetal development. If implantation has not proceeded sufficiently during the menstrual cycle to allow hormonal feedback to the ovary, then the next cycle may commence leading to conceptus loss. There is also evidence, from animal models, that a conceptus with major genetic does not develop or implant correctly leading to their loss during the first and second weeks of development. In recent years with the development or Assisted Reproductive Technologies (ART or IVF) there is a growing interest in this process, with techniques that introduce the blastocyst into the uterus to allow normal implantation to occur.

Abnormal implantation is where this process does not occur in the body of the uterus (ectopic) or where the placenta forms incorrectly. In addition implantation can occur normally but with an abnormal conceptus, as in a hydatiform mole development. Implantation is a process in which a developing embryo, moving as a blastocyst through a uterus, makes contact with the uterine wall and remains attached to it until birth. The lining of the uterus (endometrium) prepares for the developing blastocyst to attach to it via many internal changes.

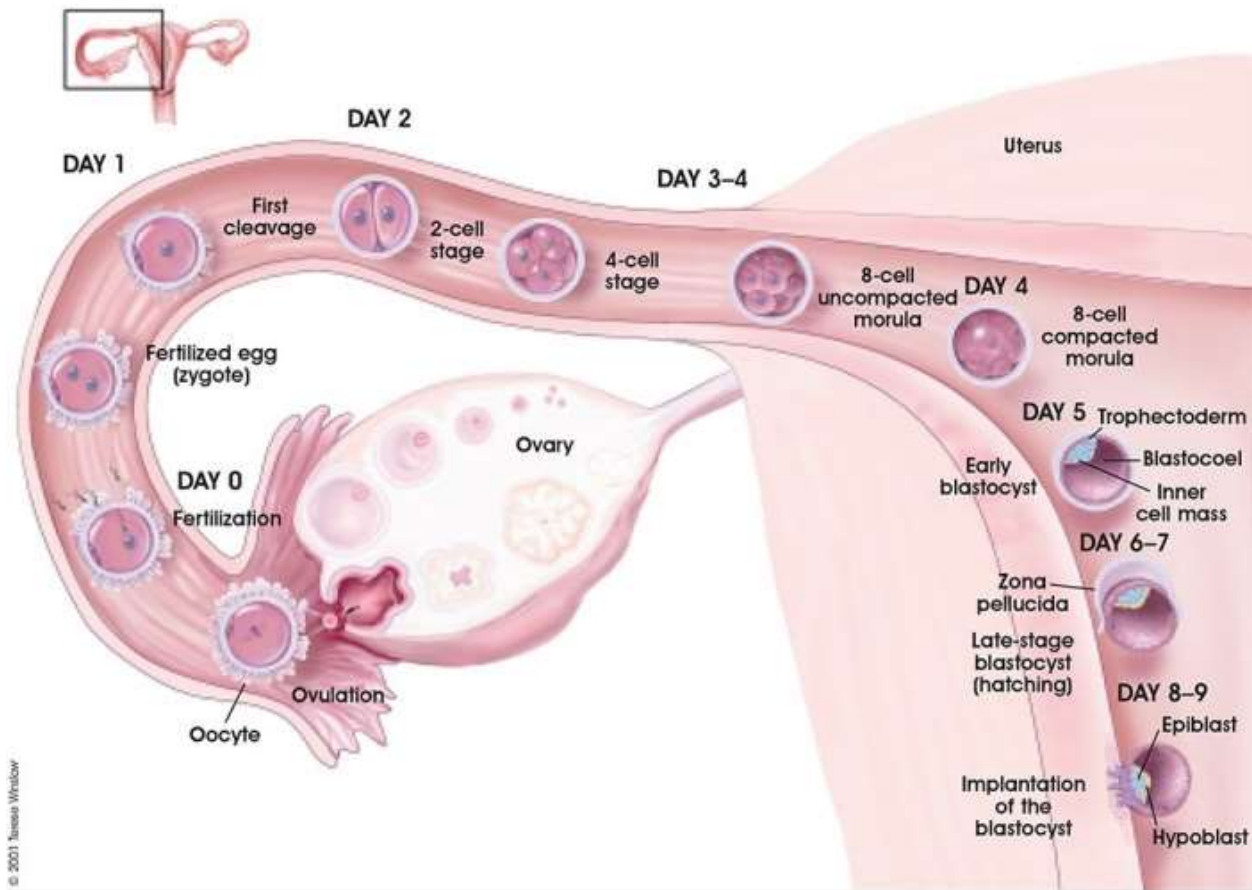
What causes a fertilized egg to not implant?

If the egg is not fertilized or does not implant, the woman's body sheds the egg and the endometrium. This shedding causes the bleeding in a woman's menstrual period. When a fertilized egg does implant, a hormone called human chorionic gonadotropin (hCG) begins to be produced in the uterus.

Symptoms of Embryo Implantation

Some women do notice signs and symptoms that implantation has occurred. Signs may include light bleeding, cramping, nausea, bloating, sore breasts, headaches, mood swings, and possibly a change in basal body temperature. But and here's the frustrating part many of these signs are very similar to PMS.

Week 1 and 2 Human Development Overview



Carnegie Stage Table

Stages	Days (approx)	Events
1	1 (week 1)	fertilized oocyte, zygote, pronuclei
2	2 - 3	morula cell division with reduction in cytoplasmic volume, blastocyst formation of inner and outer cell mass
3	4 - 5	loss of zona pellucida, free blastocyst
4	5 - 6	attaching blastocyst

Signs of successful implantation

Spotting is also known as implantation bleeding. Some women experience spotting between 10 to 14 days after conception, which is around when you will expect your period. Further Signs of Successful Implantation are;

- Sensitive breasts
- Mood swings

- Bloating
- Changing tastes
- Blocked nose
- Constipation, e.t.c.

Factors affecting embryo Implantation

Embryo implantation are described as dependent on three factors; transfer efficiency, embryo quality, and endometrial receptivity. Application of existing embryo implantation data to this model allows the calculation of the approximate value of each of these factors.

How long does an embryo take to Implant

Human blastocysts should hatch from the shell and begin to implant 1-2 days after day 5 IVF blastocyst transfer. In a natural situation (not IVF), the blastocyst should hatch and implant at the same time - about 6 to 10 days after ovulation.