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QUESTION

Write a short note on implantation

ANSWER

In humans, implantation is the stage of pregnancy at which the embryo adheres to the wall of the uterus. At this stage of prenatal development, the conceptus is called a blastocyst. It is by this adhesion that the embryo receives oxygen and nutrients from the mother to be able to grow.

In humans, implantation of a fertilized ovum is most likely to occur around nine days after ovulation; however, this can range between six and 12 days.

Implantation, in reproduction physiology, the adherence of a fertilized egg to a surface in the reproductive tract, usually to the uterine wall, so that the egg may have a suitable environment for growth and development into a new offspring.

Six to 10 days after fertilization, the naked sticky blastocyst comes into contact with the uterine lining and adheres to it. The site of attachment is variable and not predetermined. The uterine lining has already been preparing, under the influence of ovarian hormones, for the reception of the blastocyst. Among these preparations has been the elaboration and expulsion, by the uterine glands, of a secretion that serves as nourishment for the blastocyst, both when it is free and during its implantation. Directly after blastocyst attachment come its establishment within the thickened uterine lining and the participation of its trophoblastic capsule in the differentiation of a placenta, a structure that enables the developing embryo to enter into a direct physiological dependence on the mother.

The trophoblast of the blastocyst exerts an enzymic, destructive influence on the swollen uterine lining, leading to erosion of both the superficial epithelium of the uterine lining and also its deeper connective tissue. This early stage of invasion ends in a few days. The blastocyst is then completely buried within a more superficial and compact layer of the total uterine lining. While the blastocyst is completing this phase of implantation, its original shell of cellular trophoblast steadily proliferates a multitude of cells that lose their outermost membranes and merge. The result is a thick peripheral layer consisting of a common mass of cytoplasm in which many nuclei are embedded. This external investment is called syncytial trophoblast.

The implanted blastocyst next proceeds to establish itself as dependent upon the uterus. The syncytial trophoblast becomes a spongy shell containing irregular cavities. This expanding mass destroys connective tissue and glands encountered in its path. Both the cellular and derivative syncytial trophoblast have the capacity of destroying such tissue.

The erosive process also taps uterine capillaries connected to spiral arteries; blood liberated from the capillaries is taken up into the trophoblastic lacunae. The spiral arteries are then invaded by the trophoblast and increase in diameter; they are now known as uteroplacental arteries and are no longer under maternal vasomotor control. This conversion process ensures that an adequate volume of blood reaches the implanted embryo. (Altered uteroplacental blood flow is a core predictor of abnormal pregnancy and intrauterine growth restriction.) Erosive activities decline in intensity by

the end of the third week of development, and at this time the sac is completing in the first phase of its specialization.

Occasionally a fertilized egg fails to reach the uterus, implanting and beginning to develop elsewhere. This outcome is called an ectopic, or extrauterine, pregnancy. The most common ectopic site is the uterine tube—this type of pregnancy, if not treated, can be fatal for the mother—but the peritoneum lining the abdominal cavity and even the interior of the ovary are also involved, though rarely. The unsuitability of all these sites for continued development usually leads to early death and resorption of the embryo.