

MORIA ONORIODE

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NURSING

ASSIGNMENT

Write short note on implantation

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. Implantation requires hatching, adhesion and invasion into the endometrium.

Hatching: Degeneration of the zona pellucida. To be able to perform implantation, the blastocyst first needs to get rid of its zona pellucida. This process can be called hatching.

Lytic factors break down the zona pellucida.

Adhesion: The adhesion of the trophoblast to the endometrium of the uterus. Adhesion is a much stronger attachment to the endometrium than the loose apposition.

The trophoblasts adhere by penetrating the endometrium, with protrusions of trophoblast cells.

This adhering activity is by microvilli that are on the trophoblast. The trophoblast have binding fiber connections, laminin, collagen type IV, and integrins that assist in this adhesion process. There is massive communication between the blastocyst and the endometrium at this stage. The blastocyst signals to the endometrium to adapt further to its presence, e.g. by changes in the cytoskeleton of decidual cells. This, in turn, dislodges the decidual cells from their connection to the underlying basal lamina, which enables the blastocyst to perform the succeeding invasion.

This communication is conveyed by receptor-ligand-interactions, both integrin-matrix and proteoglycan ones.

Invasion: Invasion is an even further establishment of the blastocyst in the endometrium. The protrusions of trophoblast cells that adhere into the endometrium continue to proliferate and penetrate into the endometrium. As these trophoblast cells penetrate, they differentiate to become a new type of cells, syncytiotrophoblast. Invasion continues with the syncytiotrophoblasts reaching the basal membrane beneath the decidual cells, penetrating it and further invading into the uterine stroma. Finally, the whole embryo is embedded in the

endometrium. Eventually, the syncytiotrophoblasts come into contact with maternal blood and form chorionic villi. This is the initiation of forming the placenta. Syncytiotrophoblasts invade the uterus attempting to reach maternal blood supply, for setting up the foundation for fetal blood flow. Extravillous trophoblasts are cells from the invading villi that migrate into the myometrium of the mother's uterus. These cells remodel the spiral arteries to improve and secure maternal blood flow to the growing embryo.

Implantation failure is considered to be caused by inadequate uterine receptivity in two-thirds of cases, and by problems with the embryo itself in the other third.

Inadequate uterine receptivity may be caused by abnormal cytokine and hormonal signaling as well as epigenetic alterations. Recurrent implantation failure is a cause of female infertility. Therefore, pregnancy rates can be improved by optimizing endometrial receptivity for implantation. Evaluation of implantation markers may help to predict pregnancy outcome and detect occult implantation deficiency.