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Mbbs

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Embryology

2nd week of development

Second week of embryonic development

During the 2nd week of development the following are the main events that take place ;

- I) Completion of implantation of the blastocyst .
- II) Formation of bilaminar embryonic disc(Epiblast and Hypoblast).
- III) Formation of extraembryonic structures which include amniotic cavity ,amnion ,yolk sac ,connective stalk and chronic sac .

Day 8

The blastocyst is slowly embedded in the endometrium and syncytiotrophoblast erodes endometrial blood vessels and glands. More cells from the cytotrophoblast migrate to the syncytiotrophoblast .

Cells of the embryoblast differentiate into 2 layers :The hypoblast which is made up of small cuboidal cells and is nearer to the blastocyst cavity and the epiblast which is made up of high columnar cells and it is nearer to the amniotic cavity. These two make up the bilaminar embryonic disc.

Epiblast cells adjacent to the cytotrophoblast are called amnioblast. Amnioblast as well as the rest of the epiblast line the amniotic cavity .

Day 9

The blastocyst is more deeply embedded in the endometrium and the penetration defect in the surface epithelium is closed by a coagulum called fibrin. Vacuoles appear in the region of the trophoblast and fuse to form later lacunae ,this is know as the lacunae stage.

The cells of the hypoblast adjacent to the cytotrophoblast form a thin membrane called the exocoelomic (Heuser) membrane. This membrane lines the inner surface of the cytotrophoblast

The Heuser's membrane along with the hypoblast forms the lining of the exocoelomic cavity or primitive yolk sac or primary umbilical vesicle

Day 11-12

The blastocyst is completely embedded in the endometrium and the surface epithelium almost entirely covers the original defect in the uterine wall. The blastocyst now products a slight protein into the lumen of the uterus .

The cells of the syncytiotrophoblast penetrate deeper into the stroma and erode the endothelial lining of endometrial capillaries ,the ruptured capillaries are called sinusoids. The lacunae then begins to communicate with the sinusoids and maternal blood enters the lacunae system this establishes the primordial uteroplacental circulation. A new group of cells called the extra embryonic mesoderm forms between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity, cavities later develop in this mesoderm called chorionic cavity or extraembryonic cavity. The extraembryonic cavity is differentiated into two based on what it lines into somatic and splanchnic membrane forms the connecting stalk.

Day 13

The surface defect in the endometrium has been covered by the surface epithelium. Cells of the cytotrophoblast proliferate locally and penetrate the syncytiotrophoblast forming cellular columns surrounded by syncytium. Cellular columns with the syncytial coverings are known as primary villi. The primary yolk sac reduces in size and becomes a secondary yolk sac. In humans yolk sac contains no yolk but is important for transfer of nutrients between mother and fetus. Exocoelomic cysts are often found in the extraembryonic cavity. The connecting stalk becomes the umbilical cord.

Clinical correlation

The syncytiotrophoblast produces a hormone called the human chorionic gonadotropin (hCG)

It is this hormone that is used for pregnancy test.