

18/MHS01/340

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Events that take place during the second week of development

- 1] Completion of implantation of the blastocyst
- 2] Formation of bilaminar embryonic disc[epiblast and hypoblast]
- 3] Formation of extra embryonic structures

DAY 8:

- At the eighth day of development, the blastocyst is partially (slowly) embedded in the endometrium

the syncytiotrophoblast continues its invasion of the endometrium, thereby eroding endometrial blood vessels and endometrial glands

- More cells in the cytotrophoblast divide and migrate into the syncytiotrophoblast, where they fuse and lose their individual cell membranes
- Cells of inner mass are differentiated into epiblast and hypoblast;

the hypoblast layer, which is made up of small cuboidal cells, and it is adjacent(nearer) to the blastocyst cavity

the epiblast layer which is made up of high columnar cells, and it adjacent to 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 at the region of the trophoblast and they fuse to form larger lacunae

this phase of trophoblast development is known as the lacunar stage

the cells of the hypoblast adjacent to the cytotrophoblast form a thin membrane called the exocoelomic (Heuser's) membrane

this membrane lines the inner surface of the cytotrophoblast

the exocoelomic (Heuser's) membrane together with the hypoblast forms the lining of the exocoelomic cavity, or primitive yolk sac or primary umbilical vesicle

DAY 11- 12th:

- 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 produces a slight protrusion into the lumen of the uterus

cells of the syncytiotrophoblast penetrate deeper into the stroma(tissue) and erode the endothelial lining of the endometrial capillaries

- These ruptured endometrial capillaries are called sinusoids

The lacunae then begin to communicate with the sinusoids, and maternal blood enters the lacunar system

The communication of the eroded endometrial capillaries with the lacunae establishes the primordial uteroplacental circulation

- When maternal blood flows into the lacunae, oxygen and nutritive substances are available to the embryo

a new population of cells appears between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity

- These cells which are derived from yolk sac cells form a fine, loose connective tissue called the extraembryonic mesoderm

Soon, large cavities develop in the extraembryonic mesoderm, and when these become confluent, they form a new space known as the extraembryonic cavity or extraembryonic coelom

- This space surrounds the primitive yolk sac and amniotic cavity, except where the germ disc is connected to the trophoblast by the connecting stalk (which develops into the umbilical cord)

The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the extraembryonic somatic mesoderm

extraembryonic somatic mesoderm also forms the connecting stalk

the lining covering the yolk sac is known as the extraembryonic splanchnic mesoderm

Day 13:

- The surface defect in the endometrium has been completely covered by the surface epithelium

Occasionally bleeding occurs at the implantation site as a result of increased blood flow into the lacunar spaces

- The primary yolk sac becomes reduced in size and is known as the secondary yolk sac

This new cavity is known as the secondary yolk sac or definitive yolk sac or the secondary umbilical vesicle

- Exocoelomic cysts are often found in the extraembryonic cavity or chorionic cavity or extraembryonic coelom

Meanwhile, the extraembryonic coelom expands and forms a large cavity called the chorionic cavity

The extraembryonic mesoderm lining the inside of the cytotrophoblast is then known as the chorionic plate

The only place where extraembryonic mesoderm traverses the chorionic cavity is in the connecting stalk

With development of blood vessels, the connecting stalk becomes the umbilical cord

CLINICAL CORRELATE

- The syncytiotrophoblast produces a hormone called the human chorionic gonadotrophin (hCG), which enters the maternal blood via lacunae keeps the corpus luteum secreting estrogens and progesterone