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MATRIC 18/MHSD/293

COURSE EMBRYOLOGY

Discuss 2nd week of Development.

The following events occur during the 2nd week of embryonic development.

- I Completion of implantation of the blastocyst.
- II Formation of bilaminar embryonic disc [epiblast and hypoblast].
- III Formation of extraembryonic structures [amniotic cavity, amnion, umbilical vesicle [yolk sac], connecting stalk and chorionic sac].

DAY 8

- Blastocyst is partially embedded in the endometrium.
- Syncytiotrophoblast is continuing to erode the endometrium.
- Cytotrophoblast cells divide and migrate into the region of the syncytiotrophoblast.
- Embryoblast [inner cell mass] differentiate into 2 layers:

(a) Hypoblast [cuboidal cells]

(b) Epiblast [columnar cells]

- The hypoblast and epiblast together form a flat oval shaped disc called the bilaminar disc.

- At the same time, a small cavity appears within the epiblast which enlarges to form the amniotic cavity.

- Epiblast cells adjacent to the cytotrophoblast are called amnioblasts.

- Amnioblasts together with the rest of the epiblast line the amniotic cavity.

- The endometrium adjacent to the implantation site is edematous and highly vascular.

DAY 9

- The blastocyst is deeply embedded in the endometrium.

- Syncytiotrophoblast continues to erode the endometrium.

- Cytotrophoblast cells continue to divide and migrate into the region of the syncytiotrophoblast.

- Surface epithelium is closely by fibrin coagulations.

- Vacuoles appear at the region of the trophoblast and they fuse to form a larger lacuna called trophoblastic lacunae.
- This phase of trophoblast development is known as the lacunar stage.
- 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 11-12.

- The blastocyst is completely embedded in the endometrium.
- 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 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 primary 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 the yolk sac cells form a fine, loose connective tissue called 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 chorionic cavity or extraembryonic coelom.
- This space surrounds the primitive yolk sac and amniotic cavity except the ^{where} germ disc is connected to the trophoblast by connecting stalk [which develops into the

umbilical cord]

- The extraembryonic mesoderm lining the cytotrophoblast and chorion 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/visceral mesoderm.
- As the conceptus/embryo/fetus implants, the endometrial connective tissue cells undergo a transformation called decidual reaction.
- During this transformation, the cells of the endometrium swell because of the accumulation of glycogen and lipids/layers in their cytoplasm and they are known as decidual cells.
- The primary function of the decidual reaction is to provide nutrition for the embryo and an immunologically privileged site for the conceptus.

DAY 13

- Surface epithelium is completely over the surface defect endometrium.
- Occasionally, bleeding occurs at the implantation site as a result of increased blood flow into the lacunar spaces.
- Cytotrophoblast cells continue to divide and migrate into the syncytiotrophoblast, forming cellular columns surrounded by syncytium.
- Cellular columns with the superficial covering are known as primary villi.
- The primary yolk sac/exocoelomic becomes reduced in size and is known as the secondary yolk sac or definite yolk sac or the secondary umbilical vesicle.
- During its formation, large portions of the exocoelomic cavity are pinched off to form exocoelomic cysts.
- 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 chorionic cavity.
- The extraembryonic mesoderm lining the inside of the cytotrophoblast is often known as the chorionic plate.
- The plate only place where extraembryonic mesoderm transverse the chorionic cavity is in the connecting stalk.
- With the development of blood vessels, the connecting stalk becomes the umbilical cord.