**AFE BABALOLA UNIVERSITY.**

**DEPARMENT OF MEDICINE AND SURGERY.**

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**COURSE TITTLE: EMBRYOLOGY.**

1. During the second week of development, the following events take place:

* Completion of implantation of the blastocyst.
* Formation of bilaminar embryonic disc (epiblast and hypoblast).
* Formation of extraembryonic structures (amniotic cavity, yolk sac, connecting stalk, chorionic sac).

At the 8th day of development, the blastocyst is partially 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 the inner cell mass or embryoblast also differentiate into 2 layers: the hypoblast layer, which is made up of small cuboidal cells, and it is adjacent to the blastocyst cavity. The epiblast layer which is made up of high columnar cells, and it adjacent to the adjacent to the amniotic cavity. The hypoblast and epiblast layers together form a flat ovoid shaped disc called the bilaminmar embryonic 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. Amnioblast together with rest of the epiblast, line the amniotic cavity. The endometrium adjacent to the implantation site is edematous and highly vascular.

At the 9th day, the blastocyst is more deeply embedded in the endometrium, and the penetration defect in the surface epithelium is closed by the 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 lacunae stage. The cells of the hypobloast adjacent to the cytotrophoblast form a thin membrane called the **exocoelomic membrane.** This membrane together with the hypoblast forms the lining of the exoceolomic cavity or the primitive yolk sac.

At the 11th to 12th day of development, 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 communication of eroded endometrial capillaries with the lacunae establishes the primordial uteroplacental circulation. A new population of cells appears between the inner surface of the cytotrophoblast and the outer surface of the exoceolmic cavity and these cells are derived from yolk sac cells form a fine, loose connective tissues called extraembryonic mesoderm. Large cavities develop in the extraembryonic mesoderm, and when these become confluent, they form a new space called chorionic cavity. This space surrounds the primitive yolk sac and amniotic cavity, except where the germ disc is connected to the trophoblast by the connecting stalk. The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the extraembryonic somatic mesoderm which also forms the connecting stalk. The lining covering the yolk sac is known as the extraembryonic splanchic mesoderm.

At the 13th day of development, 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. Cells of the cytotrophopblast proliferate locally and penetrate locally and penetrate into the syncytiotrophoblast, forming cellular columns surrounded by syncytium. Cellular columns with the syncytial covering are known as primary villi. 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. In humans the yolk sac contains no yolk but is important for the transfer of nutrients between the fetus and mother. This yolk sac is much smaller than the original exocoelomic cavity are pinched off to form exocoelomic cysts. The exocoelomic cysts are often found in the extraembryonic cavity, 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. With the development of the blood vessels, the connecting stalk becomes the umbilical cord.

