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**18/MHS01/138**

**MBBS**

**Embryology Assignment**

1. **Discuss the Second Week Of Development**

Second Week of Development (Days 8-13)

 The key events of human development during the second week. Implantation of the blastocyst is completed during the second week of embryonic development. The following events take place during the 2nd week of development:

1. Completion of Implantation of the blastocyst
2. Formation of Bilaminar embryonic disc(Epiblast and Hypoblast)
3. Formation of Extraembryonic structures (amniotic cavity, amnion, yolk sac, connecting stalk and chronic sac).

***Day Eight of development***: At the eighth day of development, the blastocyst is partially embedded in the endometrium. The syncytiotrophoblast continues its invasion of the endometrium, and gradually destroys endometrial blood vessels and endometrial glands. Cells of the inner cell mass or embryoblast also differentiate into the **hypoblast** and **epiblast** layer. The hypoblast layer is made up of small cuboidal cells, and is adjacent to the **blastocyst cavity**. The epiblast layer is made up of high columnar cells, and it adjacent to the **amniotic cavity.** Their layers form the bilaminar embryonic disc.

***Day Nine of development:*** By now, the blastocyst is more deeply embedded in the endometrium, and the penetration defect in the surface epithelium is closed by a coagulum called **fibrin.** Meanwhile some vacuoles appear at the region of the trophoblast and fuse to form larger lacunae. This is called the **lacunar stage.**

***Eleventh to Twelfth Day of development:*** The blastocyst is completely embedded in the endometrium. The surface epithelium almost entirely covered the original defect in the uterine wall. The blastocyst now produces a slight protrusion into the lumen of the uterus. When cells of the syncytiotrophoblast rupture the endometrial capillaries, they are called **sinusoids.** The lacunae then begins to communicate with the sinusoids, and maternal blood enters the lacunar system. The communication of the destroyed endometrial capillaries with the lacunae establishes the **primordial uteroplacental circulation**. When maternal blood flows into the lacunae, **oxygen and nutritive substances** are supplied to the embryo. Cells which are derived from yolk sac cells form a fine, loose connective tissue called the **extraembryonic mesoderm**. 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. This space surrounds the primitive yolk sac and amniotic cavity. As the conceptus 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 **lipid** in their cytoplasm, they are known as **decidual cells**. The primary function of the decidual reaction is to provide nutrition for the early embryo and a safe site for the conceptus.

***Thirteenth day of development*:** The surface defect in the endometrium has been completely covered by the surface epithelium. Bleeding may occur at the implantation site due to increased blood flow into the lacunar spaces. Cells of the cytotrophoblast increase rapidly and penetrate into the syncytiotrophoblast, forming cellular columns surrounded by syncytium.

Cellular columns with the syncytial covering are known as **primary villi**. The hypoblast produces additional cells that migrate along the inside of the **exocoelomic membrane**. These cells increase and form a new cavity within the exocoelomic cavity. This new cavity is known as the **secondary yolk sac**. During its formation, large portions of the exocoelomic cavity form **exocoelomic cysts**. They are often found in the extraembryonic cavity. The extraembryonic coelom also expands and forms a large cavity called the **chorionic cavity.** The only place where extraembryonic mesoderm extends across the chronic cavity is the **connecting stalk**. When the blood vessels develop in the connecting stalk, it becomes the **umbilical cord**.