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**MATRIC NO: 18/MHS01/010**

**COURSE CODE/COURSE TITLE:  
ICBS/EMBRYOLOGY**

**MEDICINE AND SURGERY**

**200 LEVEL**

## ASSIGNMENT

### DISCUSS THE 2<sup>ND</sup> WEEK OF DEVELOPMENT

The second week of development involves three major events which are completion of implantation of the blastocyst, formation of bilaminar embryonic disc (epiblast and hypoblast), formation of extraembryonic structures.

The blastocyst is slowly embedded into the endometrium. The syncytiotrophoblast invades the endometrium destroying blood vessels while more cells of the the cytotrophoblast migrate to the syncytiotrophoblast.

Cells of the inner cell mass differentiate into small cuboidal cells called the hypoblast and high columnar cells called the epiblast. The hypoblast and epiblast come together to form the bilaminar embryonic disc. 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 highly vascular.

By the ninth day, the blastocyst is more deeply embedded into the endometrium while the penetration defect is enclosed by 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 or Heuser's membrane**. This membrane lines the inner surface of the cytotrophoblast. The **exocoelomic membrane** together with the hypoblast forms the lining of the **exocoelomic cavity**, or **primitive yolk sac** or **primary umbilical vesicle**.

By the 11<sup>th</sup> and 12<sup>th</sup> day, the blastocyst is completely embedded in the endometrium and the surface epithelium has covered every defect. Cells of the syncytiotrophoblast penetrate deeper into the stroma and erode the endothelial lining of the endometrial capillaries called sinusoids. The lacunar begins to communicate with the sinusoids and maternal blood enters the lacunar. The communication of the sinusoids with the lacunar form what is regarded as the primordial uteroplacental circulation. The maternal blood provides nutrients to the embryo.

Cells which are formed from yolk sac cells form a fine, loose connective tissue called the extraembryonic mesoderm. They appear between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity. Large cavities develop in the extraembryonic mesoderm and they form a new space known as the extraembryonic cavity. The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the extraembryonic somatic mesoderm.

Extraembryonic somatic mesoderm also forms the connecting stalk which develops into the umbilical cord. The lining covering the yolk sac is known as the extraembryonic splanchnic mesoderm.

The cells of the endometrium undergo a transformation to form decidual cells which leads to an accumulation of lipids and glycogen. The functions of these decidual cells are to provide nutrition and immunity for the embryo.

At the 13<sup>th</sup> day, the surface defect has been completely covered by the endometrium. Cells of the cytotrophoblast proliferate 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 yolk sac is much smaller than the original exocoelomic cavity or primitive yolk sac.

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. 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**.