

**OKENIYI OLUDAMILOLA LATEEFAT**

**18/MHS01/265**

## **THE SECOND WEEK OF DEVELOPMENT**

The major events take place during this week;

1. Completion of implantation
2. Formation of bilaminar germ disc
3. Development of extra embryonic structures

### **DAY 8**

At the eight day of development, the blastocyst is partially embedded in the endometrium. The syncytiotrophoblast continues to invade the endometrium. Cells in the cytotrophoblast divide and migrate into the syncytiotrophoblast, where they fuse and lose their cell membranes.

Cells in the embryoblast differentiate into two layers to form the bilaminar embryonic disc. The two layers are:

1. The hypoblast layer which is made up of small cuboidal cells and closer to the blastocyst cavity.
2. The epiblast layer which is made up of high columnar cells and closer to the amniotic cavity.

Epiblast cells adjacent to the cytotrophoblast are called amnioblast. The amnioblast and the rest of the epiblast line the amniotic cavity.

### **DAY 9**

The blastocyst is more deeply embedded in the endometrium. The surface epithelium is closed by fibrin coagulum.

Vacuoles appear at the region of the trophoblast and they fuse to form larger Lacunae. This phase is called the Lacunar stage.

The cells of the hypoblast adjacent to the cytotrophoblast form the exocoelomic (Heuser's) membrane, which lines the inner surface of the cytotrophoblast.

The Heuser's membrane together with the hypoblast forms the lining of the exocoelomic cavity or primary yolk sac or primary umbilical vesicle.

## DAY 10-12

The blastocyst is completely embedded in the endometrium. The surface epithelium almost entirely covers the original defect of the uterine wall. The blastocyst produces a slight protrusion into the lumen of the uterus.

Cells of the syncytiotrophoblast erode the endothelial lining of the endometrial capillaries. Lacunae communicates with the sinusoids (ruptured endometrial capillaries) and maternal blood enters the lacunar system.

At this stage, the primordial uteroplacental circulation is established. When maternal blood flows into the lacunae, oxygen and nutritive substances are available to the embryo.

A new population of cells derived from the yolk sac called extra embryonic mesoderm appears between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity.

Soon, large cavities develop in the extra embryonic mesoderm and form a new space called extra embryonic cavity or chorionic cavity or extra embryonic 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 coelom divides the mesoderm into two;

- The extra embryonic somatic mesoderm lining the cytotrophoblast and amnion.
- The extra embryonic splanchnic mesoderm covering the yolk sac.

As the conceptus implants, the endometrial connective tissue cells undergo a transformation called decidual reaction.

During decidual reaction, the cells of the endometrium swell because of the accumulation of glycogen and lipid in the cytoplasm and they are known as decidual cells.

The primary function of decidual reaction is to provide nutrition for the early embryo and an immunologically privileged site for the conceptus.

## DAY 13

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

Bleeding occurs occasionally at the implantation site as a result of increased blood flow into the lacunar spaces.

Cytotrophoblasts penetrate syncytiotrophoblast, forming primary villi (cellular columns with syncytial covering).

The primary yolk sac reduces in size to form secondary yolk sac or definite yolk sac or secondary umbilical vesicle.

During the formation of the secondary yolk sac, large portions of the exocoelomic cavity are pinched off to form exocoelomic to form exocoelomic cysts.

The exocoelomic cysts are usually found in the extra embryonic cavity. The extra embryonic coelom expands and forms the chorionic cavity. The extra embryonic mesoderm lining inside the cytotrophoblast is then known as the chorionic plate.

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

## CLINICAL CORRELATES

1. The syncytiotrophoblast produces a hormone called the human chorionic gonadotropin (HCG) which enters the maternal blood via lacunae and keeps the corpus luteum secreting estrogen and progesterone. It also maintains the hormonal activity of the corpus luteum in the ovary during pregnancy. HCG can be detected in maternal blood or urine as early as day 10 of pregnancy and is a basis of pregnancy test. Enough HCG is produced by the syncytiotrophoblast at the end of second week to give a pregnant positive test, even though the woman is probably unaware that she is pregnant.
2. Extrauterine Implantation: The blastocyst may implant outside the uterus. These implantations result in ectopic pregnancies. 95% to 98% of ectopic implantations occur in the uterine tubes, most often in the ampulla and isthmus.