

NAME: CHUKWU IKENNA SIMEON

MATRIC NUMBER: 18/MHS01/117

COURSE: EMBRYOLOGY

COURSE CODE: ICBS

ASSIGNMENT

- Discuss the second week of development.

The second week of development involves the implantation process and blastocyst differentiation. This is a period of hatching. Rapid blastocyst differentiation into extra embryonic and embryonic tissues and proliferation. The implanting conceptus releases a hormone hCG or human Chorionic Gonadotropin which stimulates maternal hormonal changes that stops the menstrual cycle.

Key events that take place during the second week includes:

- Completion of implantation of blastocyst in the endometrium
- Formation of bilaminar germ disk
- Formation of extra embryonic structures.

Implantation is a biochemical process that begins in the first week of gestation and extends into the second week. In this process, the uterine wall undergoes a series of changes in order to facilitate the blastocyst which means the blastocyst is partially embedded in the inner uterine wall(endometrium). The **syncytiotrophoblast** also invades the endometrium mostly eroding the endometrial vessels and glands. It usually occurs approximately at the eighth day of development. When the syncytiotrophoblast invades the endometrial vessels, it creates Lacunae which fuses to form lacunar networks. The maternal blood that flows in and out of the networks exchanges forms the basis of a primitive uteroplacental circulation. The embryoblast differentiate into two layers :the hypoblast layer made up of cuboidal cells and the epiblast layer made up of columnar cells.

During implantation, the endometrial cells undergo residual reaction where there is the accumulation of glycogen and lipid in its cytoplasm. The cells are known as decidual cell. The function of the reaction is nutrition for the embryo.

NB: The hypoblast and the epiblast together forms the **bilaminar germ disk** or the **bilaminar embryonic disk**.

A small cavity or space appears within the epiblast which forms the **amniotic cavity** which are lined by **amnioblasts**.

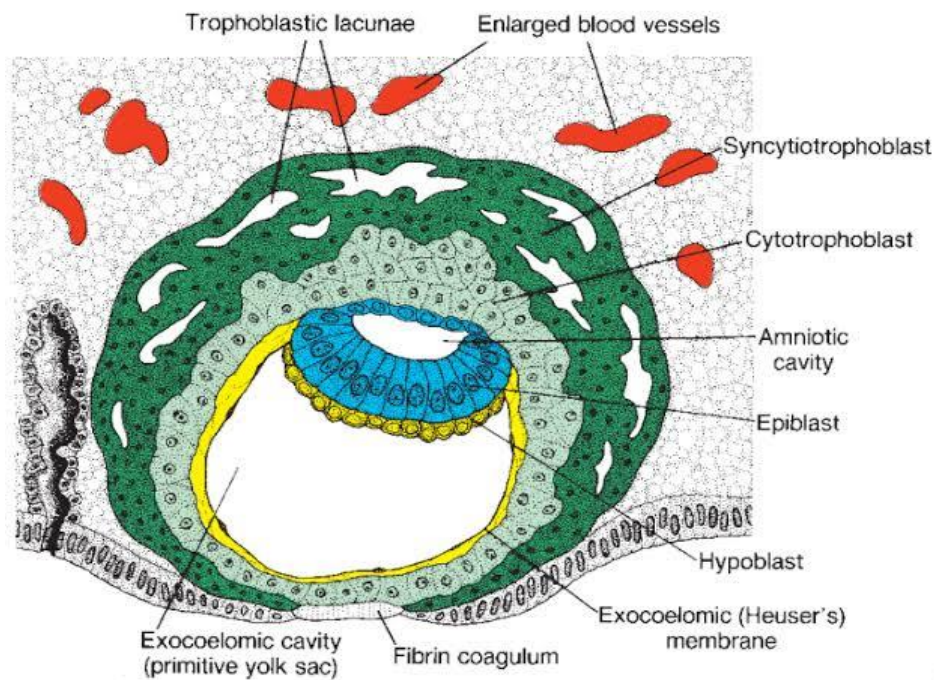
Blastocyst invading the endometrium become more deeply embedded in it. There are some vacuoles at the region of the trophoblast fusing to form larger lacunae. The stage is known as **lacunae stage**.

The hypoblast cells migrate to the cytotrophoblast form the **exocoelomic membrane** or **Heuser's membrane**. This membrane joins the hypoblast to form the **yolk sac** or **exocoelomic cavity**. The primary yolk sac becomes reduced in size and is known as the secondary yolk sac important for transfer of nutrients between the fetus and mother. It usually occurs approximately at the ninth and tenth day of development.

Later the blastocyst becomes completely embedded in the endometrium. It produces a slight protusion into the lumen of the uterus. The cells of syncytiotrophoblast enter deeper into the endometrial vessels and rupture the capillaries to form **sinusoids**. The cells derive from the yolk sac form a tissue called the **extra embryonic mesoderm**. The cells of the extra embryonic mesoderm migrate between the cytotrophoblast, yolk sac and amnion. Large cavities form into the embryonic mesoderm forming a new space known as the **chorionic cavity** or **extra embryonic coelom**. The extraembryonic mesoderm limit the amnion is the **extraembryonic somatic mesoderm**. The extraembryonic somatic mesoderm also forms the connecting stalk that is the primordium of the umbilical cord. The mesoderm lining the yolk sac is the **extraembryonic splanchnic mesoderm**. The events take place approximately during the eleventh to twelfth day of development.

Cytotrophoblast cells proliferate into the syncytiotrophoblast forming cellular columns surrounded by syncytium known as **primary villi**.

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



Clinical correlations

- Early pregnancy testing: hCG produced by syncytiotrophoblast can be detected in maternal blood or urine as early as day 10 of pregnancy and is the basis of pregnancy test.
- Hydatidiform mole: a blighted blastocyst leads to death of the embryo, which is followed by hyper plastic proliferation of the trophoblast within the uterine wall.
- Choriocarcinoma: a malignant tumour arising from trophoblast cells that may occur following a normal pregnancy, abortion, or a hydatidiform mole.
- Placenta previa: a situation where the placenta may cover the internal cervical os. It may lead to preterm labour.