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2ND WEEK OF EMBRYONIC DEVELOPMENT

Three main things occur at the second week of embryonic development. These stages are;

- Completion of implantation of the blastocyst
- Formation of the bilaminar germ disc
- Formation of extra embryonic structures

COMPLETION OF IMPLANTATION OF THE BLASTOCYST

This stage continues from day 8 as the syncytiotrophoblast continues to erode the endometrium. The cells of the syncytiotrophoblast erodes deeper into the endometrium as as it goes deeper, it becomes larger in size. The cells of the endometrium become receptive i.e. the degenerate and undergo apoptosis as the endometrium engulfs them. They also serve as nutrient for the developing embryo. Several factors such as cell adhesive molecules, prostaglandins, progesterone and HCG, cytokines and so on are responsible for the receptiveness of the endometrium.

Also, as the syncytiotrophoblast erodes, the cytotrophoblast moves deeper into the region of the syncytiotrophoblast because of their great mitotic ability.

FORMATION OF BILAMINAR GERM DISC

As at this time, the blastocycst is completely implanted into the endometrium of the uterus. Note that the endometrium adjacent to the syncytiotrophoblast is very edemateous and highly vascular. After full implantation, the blastocyst develops an amniotic cavity. This amniotic cavity separates the embryoblasts into the;

- Epiblast
- Hypoblast
- Amnioblast.

The epiblasts are columnar shaped cells that face the amniotic cavity, while the hypoblasts are cuboidal shaped cells that directly faces the blastocystic cavity. The amnioblasts are the cells that are directly adjacent to the cytotrophoblast. Now, as a result, there are two cavities inside of the blastocyst i.e. the amniotic cavity and the blastocystic cavity. Due to the formation of the epiblast and hypoblast, the cell assumes a disc shapes structure at the center which is referred to as the bilaminar germ disc.

FORMATION OF EXTRA EMBRYONIC STRUCTURES

After the formation of the bilaminar germ disc, the blastocyst moves on to form extra embryonic structures. At the site of implantation, there is an injury or a deficit of cells. This is corrected by some cells aggregating themselves to become a fibrin coagulum to cover the implantation site. At the same time, the blastocyst begins to develop lacunae. This LACUNAE is for the blastocyst to be able to receive blood supply from the endometrium of the uterus. After this, a thin membrane forms over the region of the cytotrophoblast. This membrane is referred to as the EXOCOELOMIC MEMBRANE / HEUSER'S MEMBRANE. As a result, the blastocystic cavity now becomes the EXOCOELOMIC CAVITY/ PRIMITIVE YOLK SAC

At this time, the defect in the endometrium is already fully closed up by the fibrin coagulum. The syncytiotrophoblast still continues to grow and as a result it grows into the region of the endometrium which is edematous and contains blood capillaries. As a result, the syncytiotrophoblast ruptures the blood vessels, causing blood to get into its lacunae, creating a PRIMORDIAL UTERO-PLACENTA CIRCULATION. This serves as a circulation mechanism for the embryo ate this point of development. At the region of the exocoelomic membrane, between it and the cytotrophoblast, a space is formed. This space is referred to as the EXTRA EMBRYONIC MESODERM. In the extra embryonic mesoderm, large cavities are formed.

The side of the cavity directly adjacent to the exocoelomic membrane is called the EXTRA EMBRYONIC SPLANCHNIC MESODERM.

The side of the cavity directly adjacent to the cytotrophoblast is referred to as the EXTRA EMBRYONIC SOMATIC MESODERM.

The extra embryonic mesoderm coves the exocoelomic cavity and the amniotic cavity apart from a region called the CONNECTIVE STALK.

On day 13, occasional bleeding occurs as a result of increase in blood flow into the lacunae of the embryo. The cells of the cytotrophoblast proliferate into the region of the syncytiotrophoblast forming a SYNCYTIUM. The syncytium with syncytial covering is known as the PRIMARY VILLI.

The primary yolk sac becomes very small and the chorionic cavity becomes very large. The primary yolk sac then becomes smaller and is then known as the SECONDARY YOLK SAC. Note that there is no yolk in the secondary yolk sac. It is just to aid in transfer of nutrients from mother to fetus. The extra embryonic mesoderm lining the cells of the cytotrophoblast is now referred to as the CHORIONIC PLATE. The exocoelomic cavity / primitive yolk sac reduces drastically in size because large portions of the cavity are pinched off to form exocoelomic cysts.

Development of blood vessels in the connective stalk converts it into an UMBILICAL CORD.