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ASSIGNMENT

Discuss the second week of development

THE SECOND WEEK OF DEVELOPMENT

During the 2nd week of development, the following events take place:

1. Completion of implantation of the blastocyst.
2. Formation of bilaminar embryonic disc.
3. Development of extraembryonic structures.

Processes Involved in Second Week of Development

Day 8

- The blastocyst is partially embedded in the endometrium.
- The syncytiotrophoblast continues to enroll the endometrium.
- The cells of the cytotrophoblast divide and migrate into the region of the syncytiotrophoblast.
- The cells of the embryoblast (the inner cell mass) differentiate into two layers:
 - i. **Hypoblast layer**- this layer is made up of cuboidal cells and it is adjacent to the blastocyst cavity.
 - ii. **Epiblast layer**- this layer is made up of columnar cells and it is adjacent to the amniotic cavity.
- The epiblast and hypoblast give rise to the **bilaminar embryonic disc**.
- The cells of the epiblast that lie adjacent to the cytotrophoblast are called the **amnioblasts**.
- The space between the amnioblast and epiblast is called the **amniotic**

cavity.

Day 9

- The blastocyst is deeply embedded in the endometrium.
- The syncytiotrophoblast continues to enroll the endometrium.
- The cells of the cytotrophoblast continue to divide and migrate into the region of the syncytiotrophoblast.
- The surface epithelium is closed by a coagulum called fibrin.
- Vacuoles develop in the region of trophoblast and they fuse to form larger lacunae (trophoblastic lacunae).
- The cells of the hypoblast that lie adjacent to the cytotrophoblast form a thin membrane called the **exocoelomic membrane/ Heuser's membrane**.
- This membrane lines the inner surface of the cytotrophoblast.
- A cavity is formed between the exocoelomic membrane and the hypoblast and this cavity is called the **exocoelomic cavity/primitive yolk sac/primary umbilical vesicle**.

Day 11-12

- The blastocyst is completely embedded in the endometrium.
- The syncytiotrophoblast ruptures the endometrial capillaries, giving rise to **sinusoids** (these are ruptured endometrial capillaries /blood vessels).

- The lacunae begin to communicate with the sinusoids and a primordial uteroplacental circulation is established.
- Cells begin to appear between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity.
- These cells form a loose connective tissue called the **extraembryonic mesoderm**.
- A cavity is formed in the extraembryonic mesoderm and this cavity is called **extraembryonic cavity/extraembryonic coelom**.
- This cavity divides the mesoderm into two:
 - i. **Extraembryonic somatic mesoderm**- this is the extraembryonic mesoderm lining the cytotrophoblast and amnion. It also forms the connective stalk.
 - ii. **Extraembryonic splanchnic mesoderm**- this is the extraembryonic mesoderm that covers the yolk sac.
- As the conceptus implants, endometrial connective tissue cells undergo a transformation called **decidual reaction**.
- During this transformation, the cells undergo accumulation of glycogen and lipid in their cytoplasm and these cells are called **decidual cells**.
- The primary function of the 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 the surface epithelium.
- The cells of the cytotrophoblast proliferate and penetrate into the syncytiotrophoblast, forming cellular columns surrounded by syncytium.
- These cellular columns with syncytial covering are called **primary villi**.
- The primary yolk sac becomes smaller and is called **secondary yolk sac/definitive yolk sac/secondary umbilical vesicle**.
- During the formation of the yolk sac, large portions of exocoelomic cavity are pinched off to form **exocoelomic cysts**, which are often found in the extraembryonic cavity.
- The extraembryonic coelom/cavity enlarges to form a large cavity called **chorionic cavity**.
- The extraembryonic mesoderm lining the inside of the cytotrophoblast is then known as the **chorionic plate**.
- With development of blood vessels, the connecting stalk becomes the **umbilical cord**.