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EMBRYOLOGY ASSIGNMENT

SECOND WEEK OF DEVELOPMENT

3 events take place during the 2nd week of development :

1) Completion of implantation of the blastocyst
2) Formation of bilaminar embryonic disc(epiblast and hypoblast)
3) Formation of extraembryonic structures(amniotic cavity, amnion, umbilical vesicle, connecting stalk, and chorionic sac)

Day 8

- The blastocyst is partially embedded in the endometrium
- The syncytiotrophoblast is continue to enroll the endometrium
- More cells from the cytotrophoblast will continue to divide and migrate into the region of syncytiotrophoblast
- Embryoblast will differentiate into 2 layes:

  -Hypoblast ;which is made up of cuboidal cells

  -Epiblast ;which is made up of high columnar cells

Day 9

- The blastocyst is deeply embedded in the endometrium and the surface epithelium is closed by a coagulum called **fibrin**
- Vacuoles appear at the region of the trophoblast and they fuse to form lager lacunae
- The cells of the hypoblast adjacent to the cytotrophoblast form a membrane called **exocoelomic (heuser′s) membrane**
- The exocoelomic membrane together with the hypoblast form the lining of the exocoelomic cavity or primitive yolk sac or primary umbilical vesicle

Day 11-12

- The blastocyst is completely embedded in the endometrium
- The blastocyst now produces a slight protrusion into the lumen of the uterus
- Cells of the syncytiotrophoblast penetrate deeper into the stroma and erode the endothelial lining of the endometrial capillaries

- These ruptured endometrial capillaries are called sinusoids
- The lacunae then begin to communicate with the sinusoids and maternal blood enters the lacunar system
- The communication of the eroded endometrial capillaries with the lacunae establishes the **primordial uteroplacental circulation**
- When maternal blood flows into the lacunae oxygen and nutritive substances are available to the embryo
- A new population of cells appears between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity called **extraembryonic mesoderm**
- Soon large cavities develop in the extraembryonic mesoderm, they form a new space called **extraembryonic cavity** or **extraembryonic coelum**
- 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 umbilical cord)

- The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the **extraembryonic somatic mesoderm**
- The lining covering the yolk sac is known as the **extraembryonic planchnic mesoderm**
- As the conceptus implants, the endometrial tissue cells undergo a transformation called **decidual reaction**
- During this transformation, the cells of the endometrium swell because of the accumulation of glycogen and the lipid in their cytoplasm, and they are known as **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

- Occasionally bleeding occurs at the implantation site as a result of increased flow into the lacunar spaces
- Cells of the cytotrophoblast proliferate locally and penetrate into the syncytiotrophoblast forming cellular columns surrounded by the synctium
- 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 new cavity is known as the secondary yolk sac or definitive yolk sac or the secondary vesicle
- In humans the yolk sac contains no yolk but is important for the transfer of nutrients between the fetus and mother
- During it formation large portions of the exocoelomic cavity are pinched off to form **exocoelomic cysts**

- Exocoelomic cysts are often found in the extraembryonic cavity or chrionic cavity or embryonic coelum
- Meanwhile the extraembryonic coelum 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 transverses the chorionic cavity is in the **connecting stalk**
- With the development of blood vessels, the connecting stalk becomes the **umbilical cord**