

WALE-KARIGIDI OLUWATUNMISE VICTORY

B/MHS01372

EMBRYOLOGY

2nd week of embryonic development.

Three major events take place during the 2nd week of development, they include;

- a. Completion of implantation
- b. Formation of bilaminar disc
- c. Development of extra embryonic structures

These events takes place from the 8th day to the 13th day after fertilization.

Day 8

- The blastocyst is partially embedded in the endometrium.
- The syncytiotrophoblast will continue to erode the endometrium (the blood vessels and capillaries are found there).
- The cells of the cytotrophoblast will continue to divide and migrate into the region of the syncytiotrophoblast, where they fuse and lose their individual membrane.
- The inner cell mass, embryoblast, divided into 2 types, namely the hypoblast (cuboidal cells) and the epiblast (columnar cells). The hypoblast is adjacent to the blastocyst cavity while the epiblast is adjacent to the amniotic cavity.
- The epiblast and hypoblast give rise to the bilaminar germ disc.
- Epiblast cells adjacent to the cytotrophoblast are called amnioblasts, they line and surround the amniotic cavity.

Day 9

- The blastocyst is deeply embedded in the endometrium. This causes the surface epithelium (the opening) to be closed by a fibrin coagulum.
- Vacuoles then develop in the region of the syncytiotrophoblast, they develop and become bigger. It is then called trophoblastic lacunae.
- The cells of the hypoblast form a membrane that develops and lies adjacent to the region of the cytotrophoblast. It is called the exocoelomic membrane or

Heuser's membrane.

- The membrane lines a cavity called the exocoelomic cavity/primary yolk sac/primary umbilical vesicle.

Day 11-12

- The blastocyst is completely embedded in the endometrium and the surface epithelium almost entirely covers the original defect in the uterine wall.
- The blastocyst produces a slight protrusion into the lumen of the uterus.
- The syncytiotrophoblast continues to erode into the endometrium causing damages to capillaries, causing ruptures capillaries called sinusoids.
- The sinusoids communicate with the trophoblastic lacunae, aiding the transfer of blood and nutrients as well as oxygen.
- At this stage, a primordial uteroplacenta circulation is established.
- A space of mesoderm develops into the regions between the exocoelomic membrane & cytotrophoblast and between the cytotrophoblast and amnioblast. This is called the extra-embryonic mesoderm.
- This space surrounds the primitive yolk sac and amniotic cavity except where the germ disc is connected to the cytotrophoblast by the connecting stalk.
- Large cavities develop in the mesoderm region and are referred to as extra-embryonic cavities or chorionic cavities or extra-embryonic coelom.
- These cavities divide the mesoderm into 2 parts, namely;
 - the region that lies closer to the cytotrophoblast is the extra-embryonic somatic mesoderm.
 - the region lining the exocoelomic membrane is the extra-embryonic splanchnic mesoderm.
- As the conceptus implants, the endometrial connective tissue cells undergo a transformation called decidual reaction. Glycogen and lipids are accumulated in their cytoplasm causing the endometrium to swell.
- This reaction is to provide nutrition and 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 blood flow into the lacunar spaces.
- ◆ The cells of the cytotrophoblast proliferate locally and penetrate into the syncytiotrophoblast forming cellular columns surrounded by the syncytium.
- ◆ Cellular columns with the syncytial covering are known as primary villi.
- ◆ A portion of the primary yolk sac is removed and hinged up to form exocoelomic cyst. Also large portions of the exocoelomic cavity are pinched off to form exocoelomic cysts.
- ◆ Exocoelomic cysts are found in the extra-embryonic cavity.
- ◆ The primary yolk sac becomes reduced in size and becomes the secondary yolk sac. The secondary yolk sac is smaller than the primary yolk sac.
- ◆ The extra-embryonic coelom expands forming a large cavity called the chorionic cavity.
- ◆ The extra-embryonic mesoderm lining inside of the cytotrophoblast is then known as the chorionic plate.
- ◆ With development of blood vessels, the connecting stalk becomes the umbilical cord.

Clinical Correlates

- ❖ The syncytiotrophoblast produces a hormone, human chorionic gonadotrophin (hCG), which enters the maternal blood via the lacunae. It keeps the corpus luteum secreting estrogen and progesterone.
- ❖ hCG is the basis for pregnancy tests and can be detected as early as day 10 in the maternal blood or urine.
- ❖ Extrauterine implantation: blastocysts may implant outside the uterus resulting in ectopic pregnancies. 95% to 98% occur in the uterine tubes, often in the ampulla and isthmus.