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MATRICULATION NUMBER: 18/MHS01/291

DEPARTMENT: MEDICINE AND SURGERY

COURSE: EMBRYOLOGY

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QUESTION

Discuss the second week of development.

ANSWER

The second week of human development involves three stages, which include:

- Completion of implantation of blastocysts.
- Formation of the bilaminar embryonic disc.
- Formation of extraembryonic structures.

8TH DAY

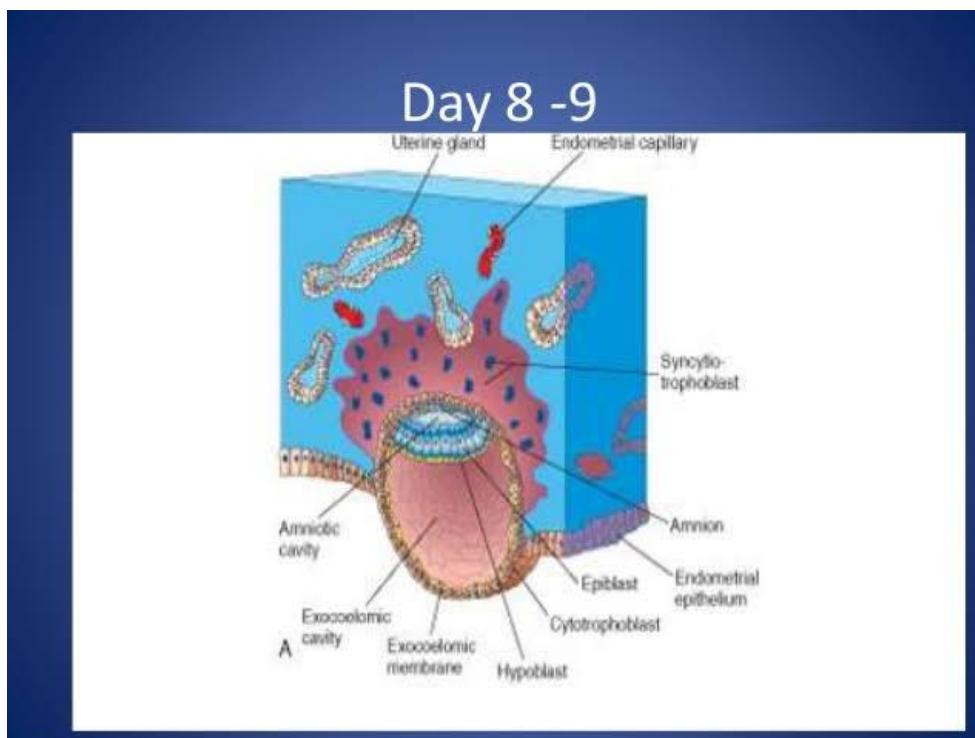
The blastocyst is partially embedded in the endometrium. The syncytiotrophoblasts continue to erode the endometrial glands and blood vessels. More cells of the cytotrophoblast divide and migrate to the syncytiotrophoblasts region where they fuse and lose their cell membranes. Cells of the inner mass divide into two layers;

- i. The hypoblast, the small cuboidal cells close to the blastocystic cavity.
- ii. The epiblast, the high columnar cells found close to the amniotic cavity.

The hypoblast and epiblast form an ovoid flat shaped disc called BILAMINA DISC. Between the epiblasts, a cavity occurs called amniotic cavity. The epiblast cells found close to the cytotrophoblast is called amnioblasts. The amnioblasts together with the epiblast line the amnion cavity. The endometrium close to the implantation site is edematous and highly vascularized.

9TH DAY

The blastocyst is more deeply embedded in the endometrium. The surface epithelium is closed by a coagulum called FIBRIN COAGULUS. Vacuoles appear in the trophoblasts and they combine to give rise to LACUNAE. The hypoblast adjacent to the cytotrophoblast give rise to exocoelomic membrane. The exocoelomic membrane and the hypoblast line the exocoelomic cavity/primitive yolk/primary umbilical vesicle.

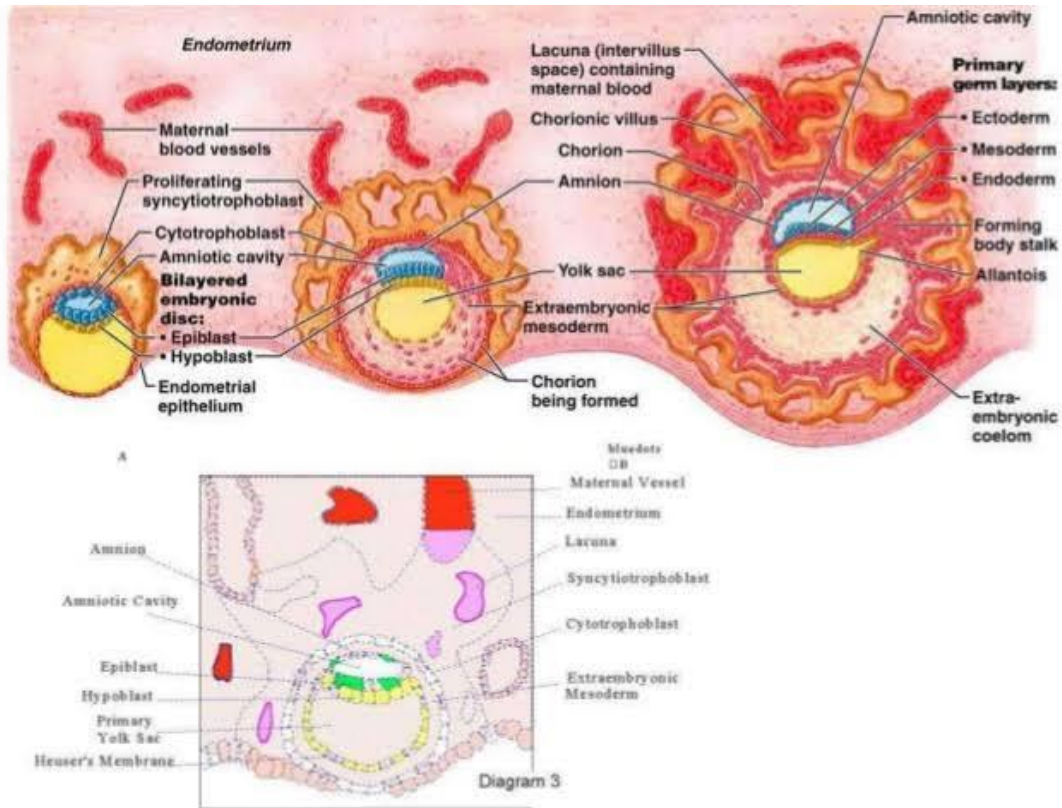


11TH-12TH DAY

The blastocyst is now completely embedded in the endometrium causing the protrusion of the lumen of the endometrium. As syncytiotrophoblasts erode the endometrium and causing the endometrial lining of the endometrium capillaries begins to get ruptured and these ruptured capillaries are called sinusoids. The sinusoids begin to communicate with the lacuna system and gets filled with maternal blood. The communication begins about the primordial umbilical placental circulation. As blood fill the lacuna system, nutrients in maternal blood are been transmitted to the zygote.

A new population of cells appear between the inner surface of cytotrophoblast and the outer surface of the exocoelomic cavity. The cells are derived from the yolk sac cells to form a fine loose connective tissue called extraembryonic mesoderm. Large cavities start to appear in the extraembryonic mesoderm, when they become confluent, they form a space called extraembryonic cavity, this is surrounded by primitive yolk sac and amniotic cavity except where the bilaminar disc is connected to the trophoblasts by connecting stalk (which develops into umbilical cord). The extraembryonic mesoderm lining the cytotrophoblast and the amnion cells is called the somatic extra embryonic mesoderm and those lining the yolk sac is called extra embryonic splanchnic mesoderm.

As the blastocyst implants, the cells of the endometrium undergo decidual reaction meaning the cells of the endometrium swell as a result of accumulation of glycoproteins and lipids in their cytoplasm and these cells are called decidual cells. The aim of these decidual reaction is so that nutrients can be provided for the embryo.



CLINICAL CORRELATES

- The syncytiotrophoblasts produce a hormone called human chorionic gonadotropin (hcGn), which enters the maternal blood through the lacunar system and it makes the corpus luteum to continue to produce estrogen and progesterone.
- The human chorionic gonadotropin hormone is responsible for the hormonal activity of the corpus luteum in the ovary.