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College/Department: MHS/MBBS

Course: Anatomy {Embryology}

Level: 200

1. Discuss the second week of development

Three major events take place during the second week of development. They are as follows:

a) Completion of implantation

b) Formation of a bilaminar germ disc

c) Development of extra embryonic structures

**Day 8**

* The blastocyst is partially embedded in the endometrium
* The syncytiotrophoblast will continue to erode the endometrium. It erodes the capillaries and blood vessels.
* The cells of the cytotrophoblast will continue to divide and migrate into region of the syncytiotrophoblast.
* The embryoblast divides into 2 types of cells called the cuboidal cell (hypoblast) and columnar cells (epiblast).
* The cells of the epiblast that are adjacent or nearer to the cytotrophoblast are called amnioblast.
* The epiblast surround a cavity called amniotic cavity.
* The epiblast and hypoblast give rise to the bilaminar germ disc

**Day 9**

* The blastocyst is deeply embedded in the endometrium
* The surface epithelium is closed by a blockage called fibrin coagulum
* The exo-coelomic membrane lies adjacent to the cytotrophoblast. The exo-coelomic membrane is also called Heuser’s membrane.
* The exo-coelomic membrane cavity/primary yolk sac/primary umbilical vesicle is formed between the hypoblast and exo-coelomic membrane.
* Vacuoles develop in the region of the syncytiotrophoblast and they are called the trophoblast lacunae.

**Days 11-12**

* The blastocyst is completely embedded in the endometrium. The syncytiotrophoblast continues to erode the endometrium and the cells of cytotrophoblast will continue to divide and migrate into the region of the syncytiotrophoblast.
* The blastocyst continue to rupture the capillaries and ruptured capillaries are called sinusoids. The sinusoid communicates with the trophoblastic lacunae.
* At this stage a primordial uteroplacental circulation is formed. The lacunae transports oxygen and nutrients to the blastocyst.
* A space of mesoderm develop between the region of amnion and cytotrophoblast and also between the exo-coelomic membrane and the cytotrophoblast except at a point where there is a connecting stalk. This is called the extraembryonic mesoderm.
* Inside of the extraembryonic mesoderm some cavities begin to develop and these cavities are called extraembryonic cavities/coelom.
* This cavity divides the mesoderm into 2 different parts. The part of the mesoderm that lines the cytotrophoblast is called extraembryonic somatic mesoderm.
* The mesoderm lining the amnion and exo-coelomic membrane is called the extraembryonic splanchnic mesoderm.
* A reaction takes place called decidual reaction and it involves the accumulation of glycogen and lipids in cytoplasm of the endometrium of glycogen and lipids in the cytoplasm of the endometrium cells. These cells are decidual cells.
* The primary function of the decidual reaction is to provide nutrition for the early embryo and an immunologically privileged site of the conceptus.

**Day 13**

* Surface defect in the endometrium has been completely covered by surface epithelium. Increased blood flow from the lacunar spaces.
* Bleeding occurs at the implantation site as a result of increased blood flow into the lacunar spaces.
* Cytotrophoblast acquire syncytium( primary villi) that extend into the region of the syncytiotrophoblast
* Connecting stalk gives rise to the primordial umbilical cord
* The extraembryonic cavity enlarges to form the chorionic cavity
* Primary yolk sac becomes smaller to form a secondary yolk sac/umbilical vesicle. A small portion it was pinched off to form the exo-coelomic cyst

**Clinical correlates**

* The syncytiotrophoblast produces a hormone called the human chorionic gonadotrophin (HCG), which enters the maternal blood via lacunae keeps the corpus luteum secreting estrogens and progesterone
* HCG maintains the hormonal activity of the corpus luteum in the ovary during pregnancy