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MATRIC NO: 18/MHS01/057

DEPARTMENT: Medicine and Surgery

COURSE: Embryology

QUESTION

1. Discuss the second week of development

ANSWER

The following events take place during the 2nd week of development:

- I. Completion of implantation of the blastocyst
- II. Formation of bilaminar embryonic disc(epiblast and hypoblast)
- III. Formation of extraembryonic structures(amniotic cavity, amnion, umbilical vesicle [yolk sac], connecting stalk, and chorionic sac)

DAY 8

- At the eighth day of development, the blastocyst is partially (slowly) embedded in the endometrium.
- The syncytiotrophoblast continues to erode the endometrium.
- The cells of the cytotrophoblast will divide and migrate into the syncytiotrophoblast.
- The inner cell mass (embryoblast) into; hypoblast (cuboidal cells) and epiblast (columnar cells).
- The epiblast and hypoblast give rise to the bilaminar germ disc.
- The cells of the epiblast that are adjacent to the cytotrophoblast are called amnioblasts.
- The space between the amnioblast and the epiblast is called the amniotic cavity.

DAY 9

- The blastocyst is deeply embedded in the endometrium.
- Surface epithelium is closed by fibrin coagulum.
- Vacuoles appear at the region of the trophoblast and they fuse to form larger lacunae.
- The cells of the cytotrophoblast will continue to divide and migrate into the syncytiotrophoblast.
- The cells of the hypoblast adjacent to the cytotrophoblast form a thin membrane called the exocoelomic (Heuser's) membrane
- The cavity between the exocoelomic membrane and hypoblast is called the exocoelomic cavity/ primitive yolk sac/ primary umbilical vesicle.

DAY 11- 12

- The blastocyst is completely embedded in the endometrium.
- Cells of the syncytiotrophoblast penetrate deeper and erode the endothelial lining of the endometrial capillaries. These ruptured endometrial capillaries are called **sinusoids**.
- The sinusoids communicate with the lacunae and a primordial uteroplacental circulation is established.

- A space of mesoderm develops between the exocoelomic cavity and cytotrophoblast is called extraembryonic mesoderm.
- A cavity is developed at the mesoderm called extraembryonic cavity or extraembryonic coelom. It divides the mesoderm into two; extraembryonic somatic mesoderm – adjacent to the cytotrophoblast and extraembryonic splanchnic mesoderm.
- As the conceptus implants, the endometrial connective tissue cells undergo a transformation, called decidual reaction.
- During this transformation, the cells of the endometrium swell because of the accumulation of glycogen and 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.
- Cells of the cytotrophoblast proliferate locally and penetrate into the syncytiotrophoblast, forming cellular columns surrounded by syncytium.
- 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.
- In humans the yolk sac contains no yolk but is important for the transfer of nutrients between the fetus and mother.
- This yolk sac is much smaller than the original exocoelomic cavity or primitive yolk sac.
- During its formation, large portions of the exocoelomic cavity are pinched off to form exocoelomic cysts.
- The extraembryonic coelom 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 traverses the chorionic cavity is in the connecting stalk.
- With development of blood vessels, the connecting stalk becomes the umbilical cord.