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MEDICINE AND SURGERY

18/MHS01/193

EMBRYOLOGY

ASSIGNMENT

SECOND WEEK OF EMBRYONIC DEVELOPMENT

The following events takes place;

- Completion of implantation
- Formation of bilaminar germ disc
- Development of extra embryonic structures

DAY 8:

Blastocyst is partially embedded in the endometrium. Syncytiotrophoblast continues to erode in the endometrium. The cells of the cytotrophoblast will continue to divide and migrate into the syncytiotrophoblast.

The cells of the inner cell mass (embryoblast) differentiate into two layers;

- i. Hypoblast (cuboidal)
- ii. Epiblast (columnar)

The hypoblast and epiblast layers together form a bilaminar germ disc. A small cavity appears within the epiblast called amniotic cavity. The cells of epiblast adjacent to the cytotrophoblast are called amnioblast.

DAY 9:

Blastocyst is deeply embedded in the endometrium. The surface epithelium is closed by a fibrin coagulum. Vacuoles develop and the region of the trophoblast and fuses together to form lacunae. This stage is known as the lacunar stage.

The cells of the hypoblast adjacent to the cytotrophoblast forms a thin membrane called the exocoelomic (Heuser's) membrane. The membrane lines the inner surface of the cytotrophoblast. The exocoelomic membrane and the

hypoblast forms the lining of the exocoelomic cavity or primitive yolk sac or primitive umbilical vesicle.

DAY 10-12:

The blastocyst is completely embedded in the endometrium. The cells of the syncytiotrophoblast penetrate deeper into the stroma and erode the endothelial lining of the endometrial capillaries. The ruptured endometrial capillaries are called sinusoid. The lacunae then begin to communicate with the sinusoids transporting blood (nutrients and oxygen). A primordial utero-placenta circulation is formed.

A new population of cells appears between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity. These cells which are derived from yolk sac cells form a fine, loose connective tissue called the extra embryonic mesoderm. Large cavities develop in the extra embryonic mesoderm and which forms a cavity known as extra embryonic cavity or chorionic cavity or extra embryonic coelom.

This cavity 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 the umbilical cord). The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the extraembryonic somatic mesoderm. The extraembryonic somatic mesoderm also forms the connecting stalk the lining covering the yolk sac is known as the 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. This new cavity is known as the secondary yolk sac or definitive yolk sac or the secondary umbilical vesicle. 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.

Exocoelomic cysts are often found in the extraembryonic cavity or chorionic cavity or extraembryonic coelom. Meanwhile, 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.