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18/MHS01/214

Medicine and surgery

200 level

THE SECOND WEEK OF THE HUMAN DEVELOPMENT

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

- I. Completion of implantation of the blastocyst
- II. Formation of bilaminar embryonic disc (epiblast and hypoblast)
- III. Formation of extraembryonic structure
 - At the eighth day of development, the blastocyst is partially embedded in the endometrium. Cells of the embryoblast differentiate into 2 layers: the hypoblast layer and the epiblast layer
 - The hypoblast and epiblast layers form the bilaminar germ disc also a small cavity appears within the epiblast which enlarges to form the amniotic cavity
 - At day 9 the blastocyst is more deeply embedded in the endometrium, and the surface from which it penetrated, a defect is closed by fibrin
 - Vacuoles also appear at the region of the trophoblast and they fuse to form large lacunae
 - the cells of the hypoblast to the side of the cytotrophoblast form a thin membrane called the exocoelomic (Heuser's) membrane
 - the exocoelomic membrane together with the hypoblast forms the lining of the exocoelomic cavity, or primitive yolk sac or primary umbilical vesicle
 - Between day 11 to 13 the blastocyst is completely embedded in the endometrium and the fibrin almost covers the defect in the uterine wall
 - As cells of the syncytiotrophoblast penetrate deeper into the endometrium they erode the capillaries of the endometrium to form sinusoids
 - The lacunae then begin to communicate with the sinusoids, and maternal blood enters the lacunae to form primordial uteroplacental circulation
 - a group of cells appears between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity to form the extraembryonic mesoderm
 - Large cavities develop in the extraembryonic mesoderm, and when they come together they form the extraembryonic cavity or extraembryonic coelom

- The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the extraembryonic somatic mesoderm which also forms the connecting stalk while the lining covering the yolk sac is known as the extraembryonic splanchnic mesoderm
 - As the blastocysts implants, a decidual reaction occurs, the cells of the endometrium swell because of the accumulation of glycogen and lipid in their cytoplasm which to provide nutrition for the early embryo and an immunologically privileged site for the conceptus
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- At the 13 day the surface defect in the endometrium has been completely covered by the surface epithelium (fibrin)
 - Cells of the cytotrophoblast proliferate locally and penetrate into the syncytiotrophoblast, forming cellular columns surrounded by syncytium known as the primary villi
 - The primary yolk sac reduces in size and becomes the secondary yolk sac
 - Exocoelomic cysts are often found in the extraembryonic cavity which are as a result of large portions of the exocoelomic cavity are pinched off
 - The extraembryonic coelom widens to form called the chorionic cavity
 - The extraembryonic mesoderm lining the inside of the cytotrophoblast is then known as the chorionic plate
 - The connecting stalk develops to become the umbilical cord
 - It is important to note that during the second week the syncytiotrophoblast produces a hormone called the human chorionic gonadotrophin (hCG) that is the basis for pregnancy tests

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