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COLLEGE: MEDICINE AND HEALTH SCIENCES

DEPARTMENT: MEDICINE AND SURGERY

COURSE: EMBRYOLOGY

DATE: 15TH MAY, 2020

SECOND WEEK OF DEVELOPMENT

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

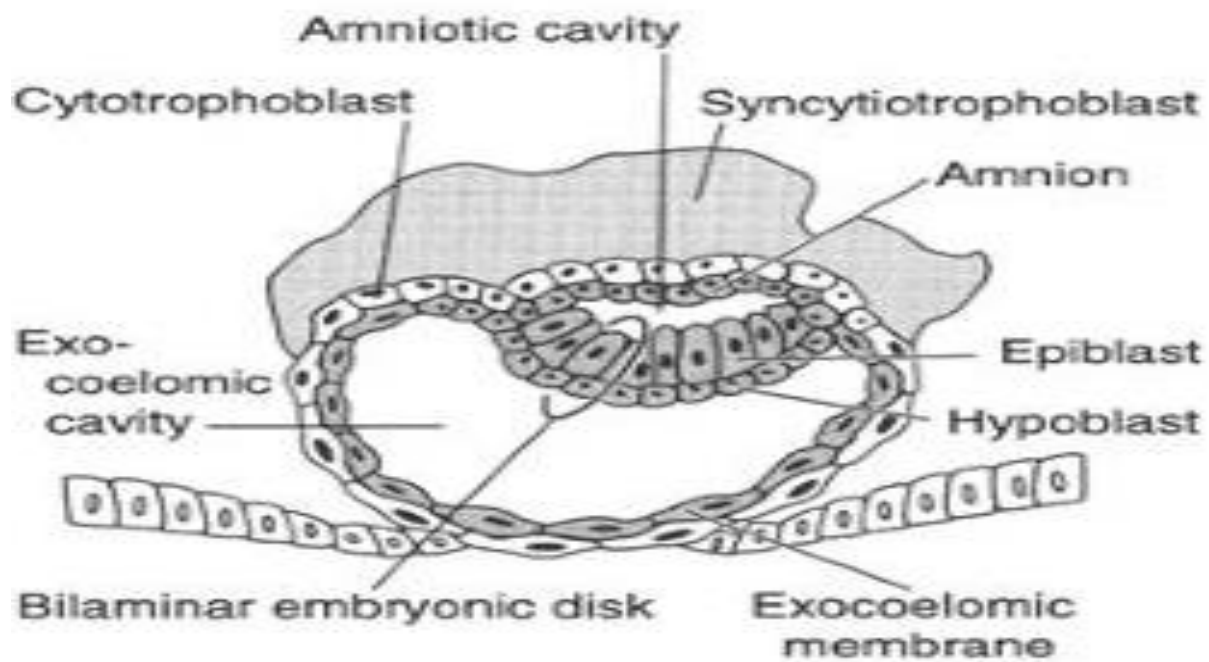
- I. Completion of implantation of the blastocyst.
- II. Formation of bilaminar embryonic disc (epiblast and hypoblast).
- III. Formation of extraembryonic structures (amniotic cavity, amnion, umbilical vesicle [yolk sac], connecting stalk, and chorionic sac).

Day 8

- At the eighth day of development, the blastocyst is partially (slowly) embedded in the endometrium.
- The syncytiotrophoblast continues its invading the endometrium, thereby eroding endometrial blood vessels and endometrial glands.
- More cells in the cytotrophoblast divide and migrate into the syncytiotrophoblast, where they fuse and lose their individual cell membranes
- Cells of the embryoblast differentiate into 2 layers: The hypoblast which is made up of small cuboidal cells and is nearer to the blastocyst cavity and the epiblast which is made

up of high columnar cells and it is nearer to the amniotic cavity. These two make up the bilaminar embryonic disc.

- Epiblast cells adjacent to the cytotrophoblast are called amnioblast. Amnioblast as well as the rest of the epiblast line the amniotic cavity.

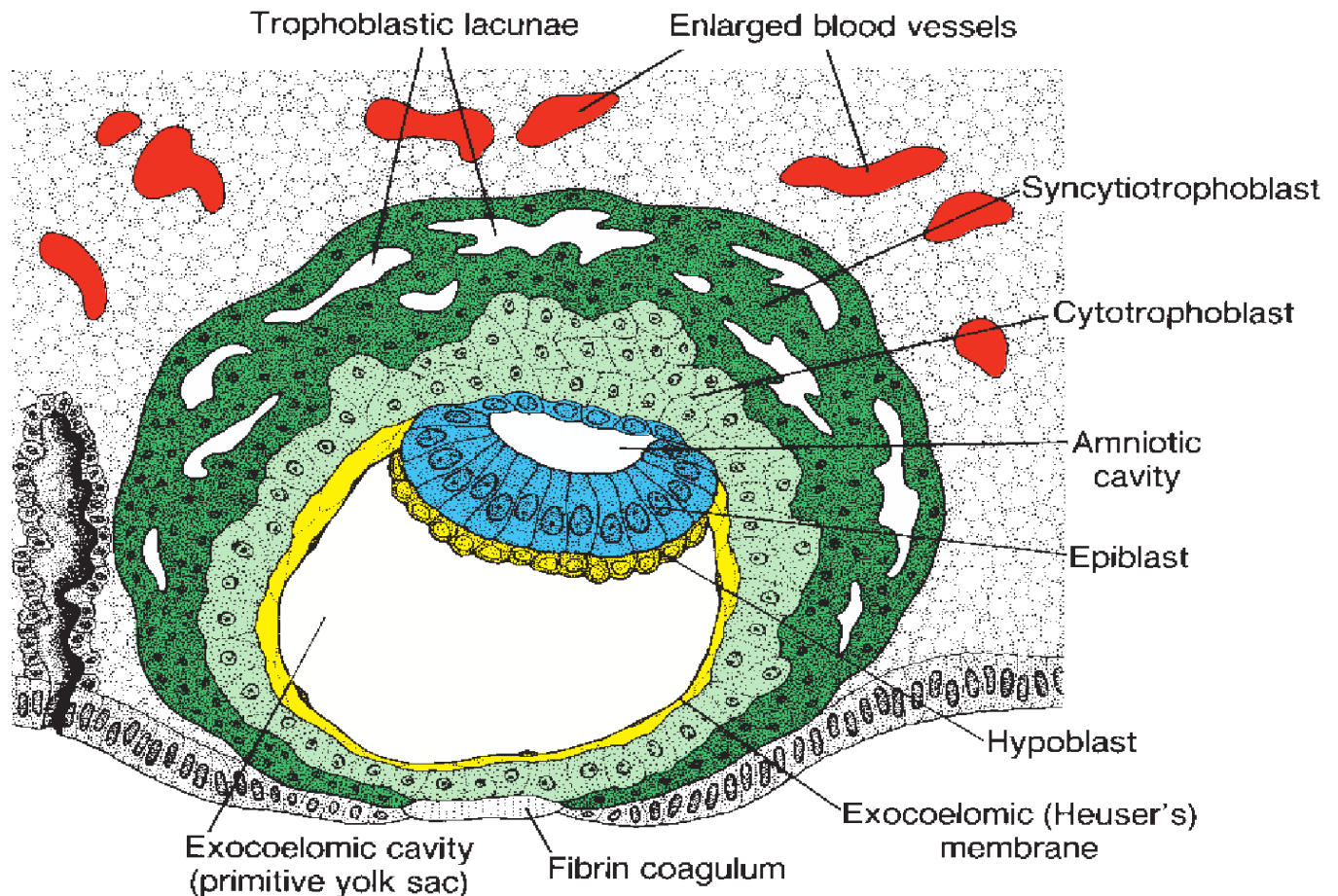


Day 9

The blastocyst is more deeply embedded in the endometrium and the penetration defect in the surface epithelium is closed by a coagulum called fibrin. Vacuoles appear in the region of the trophoblast and fuse to form later lacunae; this is known as the lacunae stage.

The cells of the hypoblast adjacent to the cytotrophoblast form a thin membrane called the exocoelomic (Heuser) membrane. This membrane lines the inner surface of the cytotrophoblast

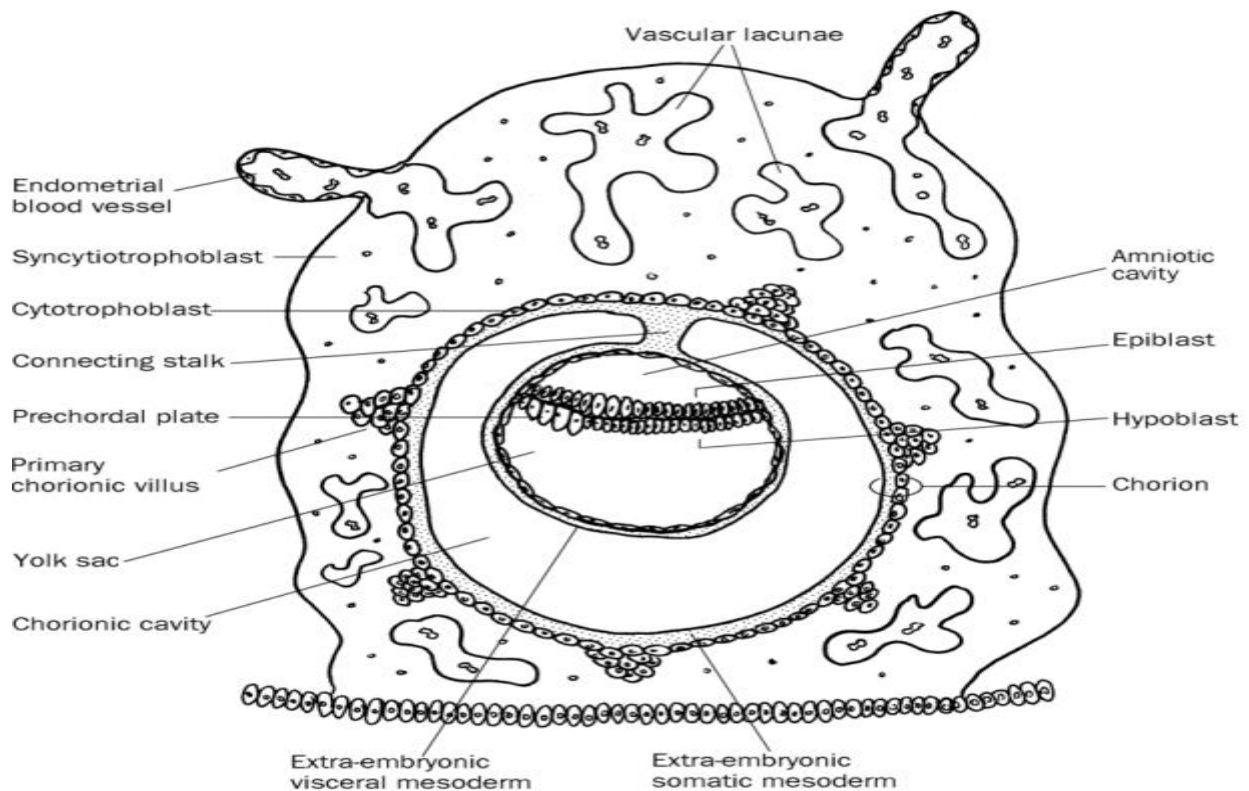
The Heuser's membrane along with the hypoblast forms the lining of the exocoelomic cavity or primitive yolk sac or primary umbilical vesicle.



Day 11-12

The blastocyst is completely embedded in the endometrium and the surface epithelium almost entirely covers the original defect in the uterine wall. The blastocyst now produces a slight protein into the lumen of the uterus.

The cells of the syncytiotrophoblast penetrate deeper into the stroma and erode the endothelial lining of endometrial capillaries, the ruptured capillaries are called sinusoids. The lacunae then begin to communicate with the sinusoids and maternal blood enters the lacunae system this establishes the primordial uteroplacental circulation. A new group of cells called the extra embryonic mesoderm forms between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity, cavities later develop in this mesoderm called chorionic cavity or extraembryonic cavity. The extraembryonic cavity is differentiated into two based on what it lines into somatic and splanchnic membrane forms the connecting stalk.



Day 13

The surface defect in the endometrium has been covered by the surface epithelium. Cells of the cytotrophoblast proliferate locally and penetrate the syncytiotrophoblast forming cellular

columns surrounded by syncytium. Cellular columns with the syncytial coverings are known as primary villi. The primary yolk sac reduces in size and becomes a secondary yolk sac. In human's yolk sac contains no yolk but is important for transfer of nutrients between mother and fetus. Exocoelomic cyst are often found in the extraembryonic cavity. The connecting stalk becomes the umbilical cord.