The 2nd week after fertilization

- The superficial implantation occurs on the 7th day,also Histolysis for the endothelium (small opening) occurs, The first thing of the blastocyst to enter is the embryonic pole (inner cell mass).
- Inner cell mass differentiates to Epiblast (primary ectoderm) and hypoblast (primary endoderm).

<u>Day 8</u>

- Superficial Implantation (at the beginning).
- Cytotrophoblast is transformed to syncytiotrophoblast .
- Originally they're trophoblast, the trophoblast differentiates into cytotrophoblast and syncytiotrophoblast, the difference between them is that the cytotrophoblast cells are cubical, undergo mitosis (continuously dividing) and have boundaries between the cells.
- When mitosis occurs in cytotrophoblast, it is transformed to syncytiotrophoblast and it loses the boundaries between its cells and mitosis.
- The most important two features in the syncytiotrophoblast is that it invades the endometrium and in the future it forms the placenta and it secretes human chorionic gonadotropin (HCG) which is considered as an important landmark of the pregnancy.
- The mitotic figures are found in cytotrophoblast but not in syncytiotrophoblast.
- When we talk about after fertilization in the uterus we talk about two things, Blastocyst (Changes) and Endometrium (between stroma, after lining epithelium, we find blood vessels (Engorged, dilated), the glands are filled with glycogen and fluid).
- We name that which is related to syncytiotrophoblast decidual reaction.
- Decidual reaction means that the endometrium is clinitous and swelling , fluid , the glands are dilated and tortuous and filled with glycogen and protein.
- at the complement of the 8th the amniotic cavity is formed in the Epiblast (in the center of the Epiblast).

- The cells below the cytotrophoblast are called amnioblast cells, which in the future give the amniotic membrane.
- And the cavity give the amniotic cavity that surrounds the whole embryo (it enlarges and surrounds the whole embryo).
- The columnar cells stay as Epiblast or primary ectoderm cells and the hypoblast cuboidal cells.
- The endometrial stroma adjacent to the implantation site is edematous and highly vascular. The large, tortuous glands secrete abundant glycogen and mucus.

<u>Day 9</u>

- By the end of the 9th day or the beginning of the 10th day the implantation should be completed.
- The whole blastocyst is now in the endometrium inside the functional layer and there is fibrin coagulum.
- Regeneration must occur in the 10th or 11th day to the endothelial cells (Endometrium is back normal without the hole).
- Formation of the exocoelomic (Heuser's) membrane which is a proliferation of the hypoblast cell (simple squamous cells that line the cytotrophoblast).
- This membrane, together with the hypoblast, forms the lining of the exocoelomic cavity, or primitive yolk sac.
- The cytotrophoblast cells are still surrounding the whole blastocyst and the most of the mitotic division occurs toward the syncytiotrophoblast that will make invasion.
- Lacunar stage (in the endometrium), Spaces will be formed inside the syncytiotrophoblast which are called trophoblastic lacunae, these spaces will be filled with maternal blood.
- There are enlarged blood vessels we call them sinusoids.

<u>Day 11, 12</u>

- Completed healing of the hole.
- Blastocyst is completely embedded in the endometrium.
- Surface epithelium is almost entirely covered by the endothelium wall (Epithelium).

- Slight protrusion in the healing place.
- The trophoblast is characterized by lacunar spaces in the syncytium that form an intercommunicating network.
- In the endometrium the maternal sinusoids are very close to the trophoblastic lacunae, then suddenly the blood fills the trophoblastic lacunae (It's clear in the 12th day).
- In the 12th day an intercommunicating network in formed between the maternal blood and the trophoblastic lacunae (Between the embryo and the endometrium).
- ** This blood is very important for nourishment of the embryo especially the bilaminar germ disc (Epiblast and hypoblast).
- The Heuser's membrane (from the primary endoderm layer) and the exocoelomic cavity are existing.
- Formation of the extraembryonic coelom (Chorionic cavity) (Chorion contributes in formation of the placenta).
- **Formation of extraembryonic mesoderm, it's called extraembryonic mesoderm because it's formed outside the two layers, it's formed from two layers, the chorionic cavity detaches the extraembryonic mesoderm in two layers:
 - The extraembryonic mesoderm lining the cytotrophoblast and amnion is called the extraembryonic somatopleuric mesoderm, (somato means جداري), (Plerua: it contributes in forming the pleura (Pleura surrond the lung)).
 - the lining covering the yolk sac is known as the extraembryonic splanchnopleuric mesoderm.
- The chorionic cavity surrounds the primitive yolk sac and amniotic cavity except where the germ disc is connected to the trophoblast by the connecting stalk.
- As the trophoblast continues to erode more and more sinusoids, maternal blood begins to flow through the trophoblastic system, establishing the uteroplacental circulation (between maternal sinusoids and trophoblastic lacunae), it's clear in the 12th day, the circulation continues until the day number 14.

- Cells of the endometrium become polyhedral and loaded with glycogen and lipids, intercellular spaces are filled with extravasate, and the tissue is edematous.
- These changes, known as the decidua reaction, at first are confined to the area immediately surrounding the implantation site but soon occur throughout the endometrium.

<u>Day 13</u>

- **The chorionic cavity enlarges على حساب
- **The primitive yolk sac transforms into secondary yolk sac (This yolk sac is much smaller than the original exocoelomic cavity, or primitive yolk sac). exocoelomiccyst are sometimes found (remanants from the change between the chorionic cavity and the primitive yolk sac).
- More blood filling the trophoblastic lacunae.
- Formation of primary villi (Finger like projections) it contains cytotrophoblast and syncytiotrophoblast.
- 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.
- Buccopharyngeal membrane is a membrane in the cephalic that splits between the oral cavity and pharynx.
- The embryo now has a head and a tail, it's between the two layers that's why we call it bilaminar germ disc.
- During its formation, large portions of the exocoelomic cavity are pinched off. These portions are represented by exocoelomic cysts, which are often found in the extraembryonic coelom or chorionic cavity.
- Chorionic cavity a large cavity formed by expansion of extraembryonic coelom.
- The extraembryonic mesoderm lining the inside of the cytotrophoblast is then known as the chorionic plate.

- With development of blood vessels, the connecting stalk becomes the umbilical cord.
- The umbilical cord has two veins and two arteries first, but then one of the veins disappear.

The Pregnancy Test

- ** The syncytiotrophoblast is responsible for hormone production including human chorionic gonadotropin (hCG).
- By the end of the second week the quantities of this hormone is sufficient, You might find it in the urine but its more accurate to look for it in the blood and it gives a landmark of pregnancy.

Done by: Mohammedd Abubaker