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EMBRYOLOGY ASSIGNMENT

DISCUSS THE SECOND WEEK OF DEVELOPMENT

Three major event takes place during the second week of development

- Completion of implantation of the blastocyst.
- Formation of bilaminar embryonic disc (epiblast and hypoblast)
- Formation of extraembryonic structure (amniotic cavity, amnion, umbilical vesicle or yolk sac, connecting stalk and chorionic-sac)

DAY 8 OF EMBRYONIC DEVELOPMENT

At the eight day of development, the blastocyst is partially embedded in the endometrium. The syncytiotrophoblast continues its invasion of 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 membrane.

Cells of the inner cell mass or embryoblast would differentiate into two layers;

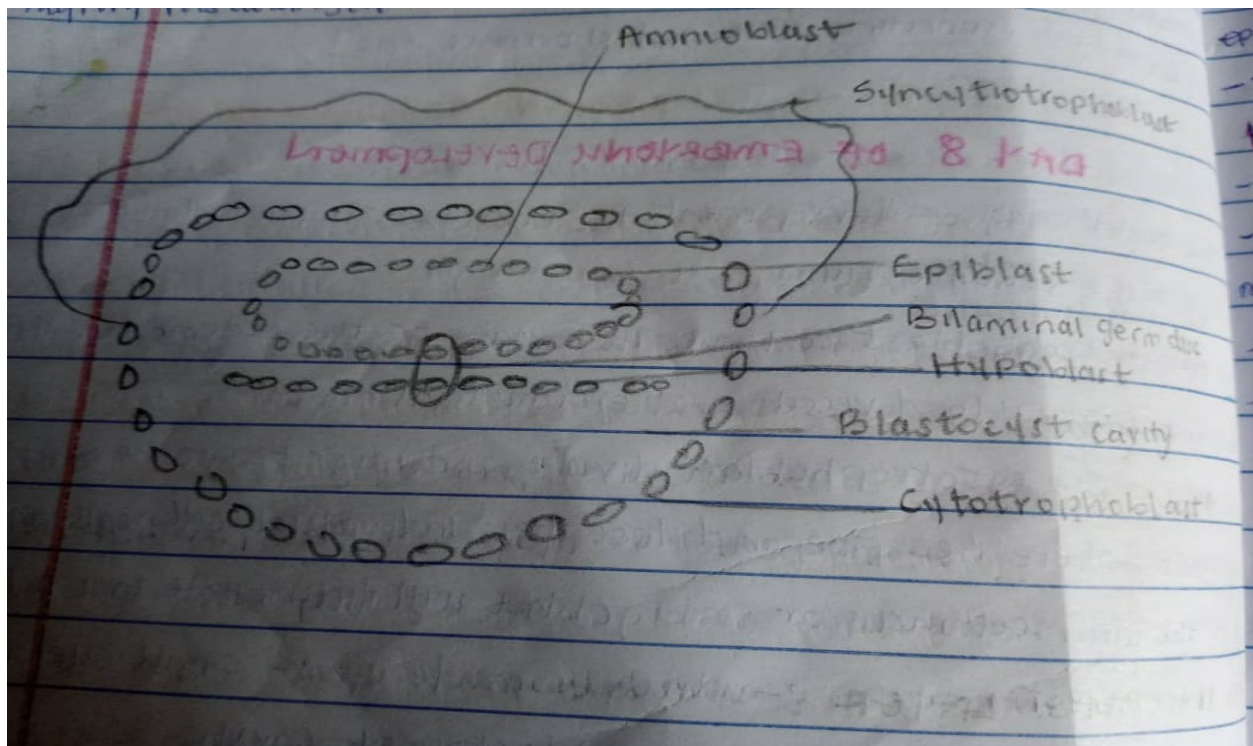
- **The hypoblast layer:** it is made up of small cuboidal and it is adjacent to the blastocyst cavity.
- **The epiblast layer:** it is made up of high columnar cells and it is adjacent to the amniotic cavity.

The hypoblast and epiblast layer together form a flat ovoid shape disk called bilaminar embryonic disk.

At the same time, a small cavity appears within the epiblast which enlarges to form the **AMNIOTIC CAVITY**.

The epiblast cells adjacent to the cytotrophoblast are called **AMNIOBLAST**.

Amnioblast together with the rest of the epiblast lines the amniotic cavity.



DAY 9 OF EMBRYONIC DEVELOPMENT

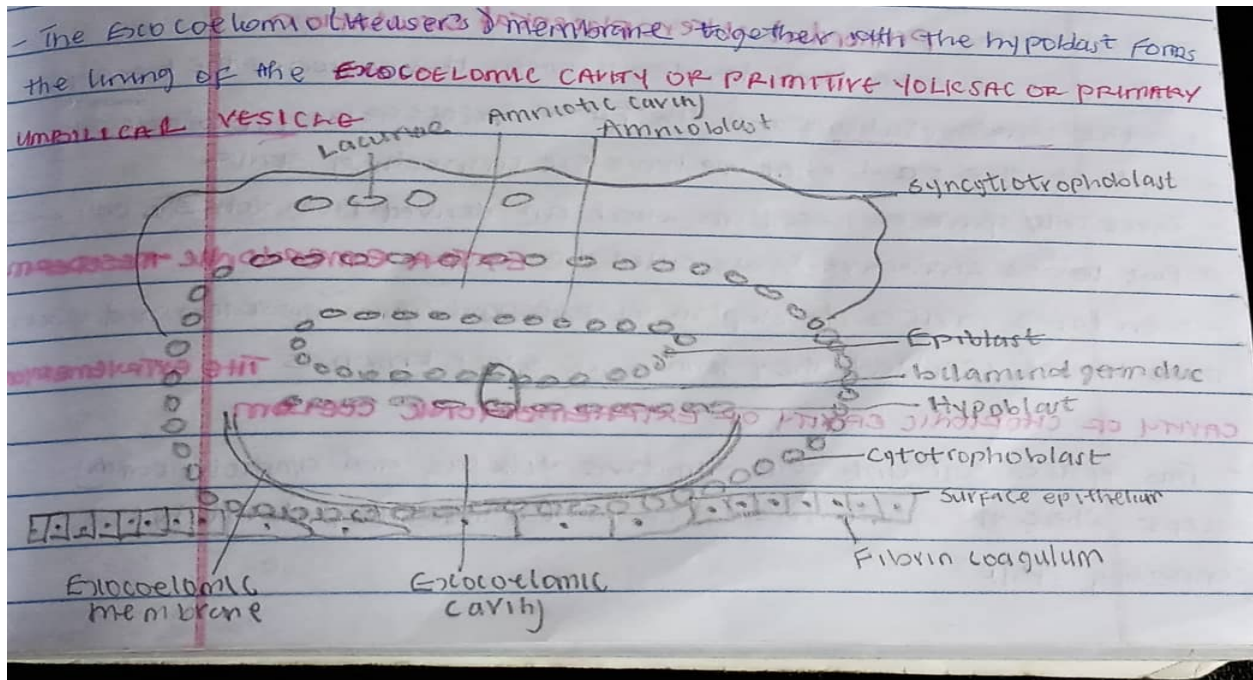
The blastocyst is more deeply embedded in the endometrium.

Because the blastocyst is deeply embedded, the surface of the epithelium is closed by a coagulum called **FIBRIN**.

Vacuoles appear at the region of the trophoblast and they fuse to form **LARGER LACUNAE**. This phase of trophoblast development is known as **LACUNAR STAGE**. The cells of the hypoblast adjacent to the cytotrophoblast form a thin membrane called **EXOCOELOMIC (HEUSER'S) MEMBRANE**.

This membrane lines the inner surface of the cytotrophoblast.

The exocoelomic (Heuser's) membrane together with the hypoblast forms the lining of the **EXOCOELOMIC CAVITY OR PRIMITIVE YOLKSAC OR PRIMARY UMBILICAL VESICLE**.



DAY 11th/12th OF EMBRYONIC DEVELOPMENT

The blastocyst is completely embedded in the endometrium.

Cells of the syncytiotrophoblast penetrate deeper into the stroma and erode the endothelia lining of the endometrial capillaries.

This ruptured endometrial capillaries are called **SINUSOIDS**.

The trophoblastic lacunae then begin to communicate with the sinusoids by helping to transport oxygen, blood and nutrient to the developing embryo.

The communication of the eroded endometrial capillaries with the lacunae establishes the **PRIMORDIAL UTEROPLACENTA CIRCULATION**.

A space of mesoderm develops between the region of the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity except at the point, where we have the connecting stalk.

This space of mesoderm which are derived from the yolk sac cells form a fine loose connective tissue called the **EXTRAEMBRYONIC MESODERM**.

Soon large cavity develops in the extra embryonic mesoderm and when this becomes confluent, they form a new space known as the **EXTRA EMBRYONIC CAVITY OR CHORIONIC CAVITY OR EXTRAEMBRYONIC COELOM**.

The extra embryonic cavity divides mesoderm into two different part

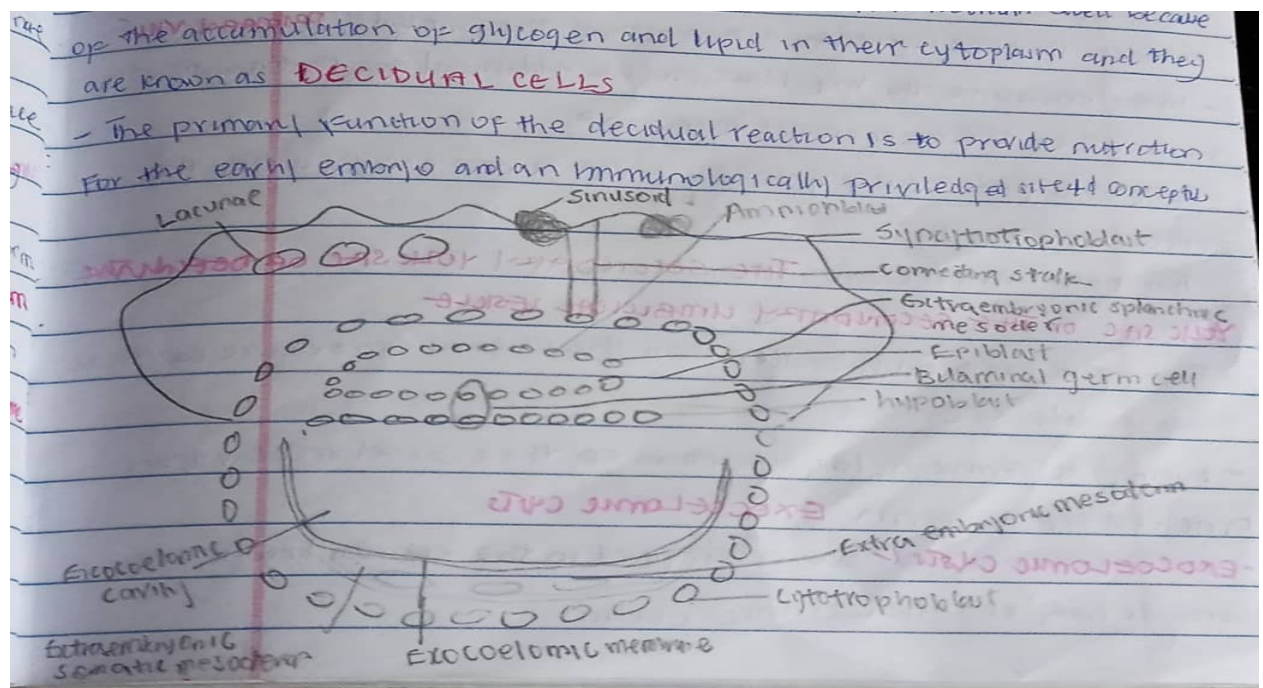
- **EXTRAEMBRYONIC SOMATIC MESODERM:** It is the extra embryonic mesoderm lining the cytotrophoblast and Amnioblast

- **EXTRAEMBRYONIC SPLANCHNIC MESODERM:** It is the extra embryonic mesoderm lining the region of cytotrophoblast and primary yolk sac.

As the conceptus implant, the endometrial connective tissues cell undergo a transformation called **DECIDUAL REACTION**.

During this transformation the cells of the endometrium swell because of the accumulation of the 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 13TH OF EMBRYONIC DEVELOPMENT

The surface defect in the endometrium has been completely covered by the surface epithelium.

Occasionally bleeding occurs at the implantation site as a result of increase blood flow to the lacunar space.

The cells of the cytotrophoblast proliferate locally and penetrate into the syncytiotrophoblast forming cellular columns surrounded by syncytium. Cellular column with the syncytia covering are known as **PRIMARY VILLI**.

So the hypoblast produces additional cells that migrate along the exocoelomic membrane.

The cells proliferate and gradually form a new cavity within the exocoelomic cavity and this new cavity is known as **THE SECONDARY YOLK SAC OR DEFINITIVE YOLK SAC OR THE SECONDARY UMBILICAL VESICLE**.

This yolk sac is much smaller than the original exocoelomic cavity or primary yolk sac.

During its formation large portion of the exocoelomic cavity are pinched off to form **EXOCELOMIC CYSTS**.

The extra embryonic coelom expands and forms a large cavity called **CHORIONIC CAVITY**.

The extra embryonic mesoderm lining the inside of the cytotrophoblast is known as the **CHORIONIC PLATE**.

The only place where the extra embryonic mesoderm traverses the chorionic cavity is in the connecting stalk.

With development of blood vessels, the connecting stalk becomes the **UMBILICAL CORD**.

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