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DEPT: MBBS

COURSE: EMBRYOLOGY

Discuss the second week of development

Notable events that occur during the second week of development are:

1. Completion of implantation by the blastocyst
2. Formation of bilaminar embryonic disc
3. Formation of extra-embryonic structures (amniotic cavity, amnion, umbilical vesicle, connecting stalk and chorionic sac)

DAY 8 of development

The blastocyst becomes partially embedded in the endometrium. The **syncytiotrophoblast** invades the endometrial wall and erodes the blood vessels and glands. The endometrial cells at the site of implantation undergo apoptosis (death). The cells of the syncytiotrophoblast and cytotrophoblast begin to appear fused.

The embryoblast differentiates into two ó **hypoblast** (made of cuboidal cells) and the **epiblast** (high columnar cells).

A space forms in the epiblast which is known as the amniotic cavity. It is lined by the epiblast and **amnioblast** (cells which are found adjacent to the cytotrophoblast).

DAY 9

The blastocyst is deeply embedded in the endometrium. A **fibrin coagulum** closes the penetration defect which was caused by the blastocyst going deeper into the endometrium. Blood vessels become enlarged.

Vacuoles appear at the trophoblastic region and enlarge to form a **trophoblastic lacunae**.

A thin membrane is formed by the cells of the hypoblast. This membrane is called the **Exocoelomic/Heuser's membrane** and it lines the inner surface of the cytotrophoblast.

The cavity which was once called the **blastocystic cavity** is now lined by the exocoelomic membrane and is now called the **Exocoelomic cavity/primitive yolk sac/primary umbilical vesicle**.

DAY 11-12

The blastocyst is now completely embedded in the endometrium. A slight protrusion now appears in the uterus. The syncytioblast erode the endometrial lining of the endometrial capillaries which causes the capillaries to rupture. The ruptured capillaries are called **sinusoids**. The trophoblastic lacunae begins communication with the sinusoids to form an **uteroplacental circulation**. Epithelial cells almost cover the coagulum site.

Cells derived from the primitive yolk sac/exocoelomic cavity, appear between the inner surface of the cytotrophoblast and the outer surface of the exocoelomic cavity to form a connective tissue called **Extraembryonic mesoderm**.

Large cavities soon appear in the extra-embryonic mesoderm to form the **Extra-embryonic cavity/chorionic cavity/extra-embryonic coelom**. The extra-embryonic cavity surrounds the primitive yolk sac and the amniotic cavity except at the site where the **connecting stalk** is formed.

The lining which now surrounds the primitive yolk sac is called the extra-embryonic splanchnic mesoderm and the lining which surrounds the cytotrophoblast is called the **extra-embryonic somatic mesoderm**.

DAY 13

The penetration defect is closed off completely by the epithelium. There is an increase in the blood supply to the lacunae which may result in bleeding. Cells of the cytotrophoblast begin to penetrate into the syncytiotrophoblast forming cellular columns which are surrounded by a syncytium (Primary Villi).

The primitive yolk sac becomes smaller in size as a large portion of it is pinched off to form an **exocoelomic cyst**. The primitive yolk sac is now called the **secondary yolk sac**.

The extra-embryonic cavity becomes larger in size to form a **Chorionic cavity**. The extra-embryonic mesoderm lining the inside of the cytotrophoblast becomes the **Chorionic plate**. The only place where the extra-embryonic mesoderm transverses the chorionic cavity is at the connecting stalk which later becomes the **umbilical cord**.