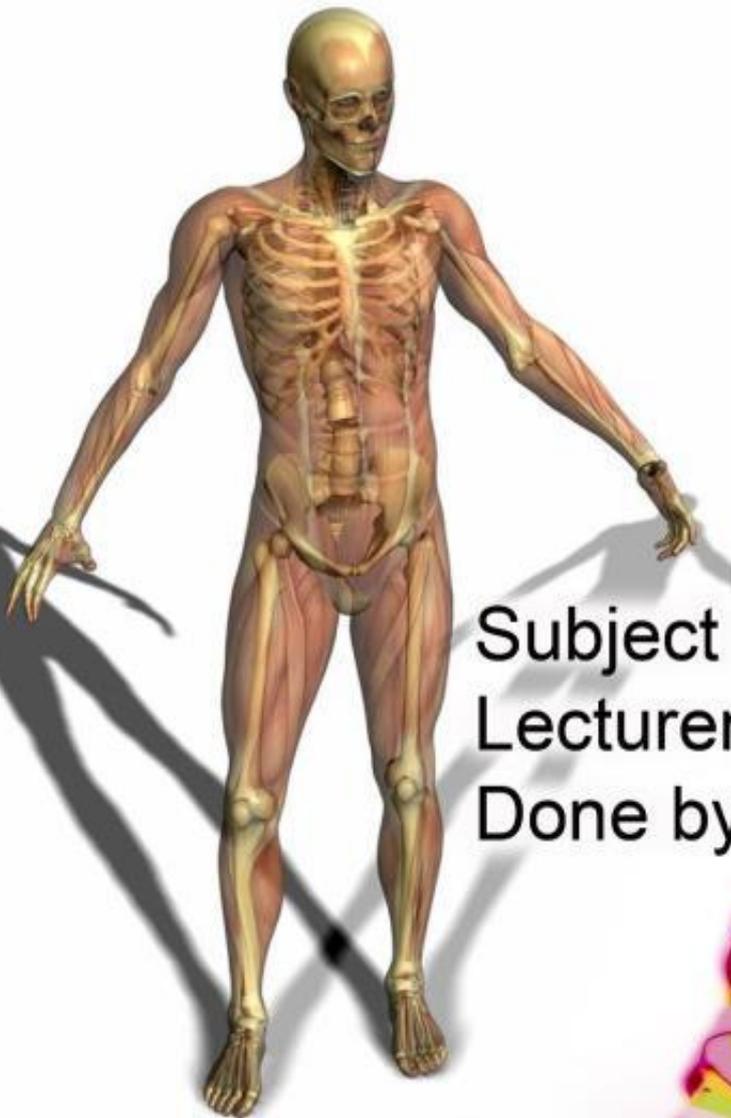




# ANATOMY

Sheet



Subject : *Embryology*

Lecturer : *Dr. Maher Hadidi*

Done by : *Lana Makahleh*

# Events during second week of Pregnancy

*Remember:*

At the first week of pregnancy, The **Blastocyst** formed of:

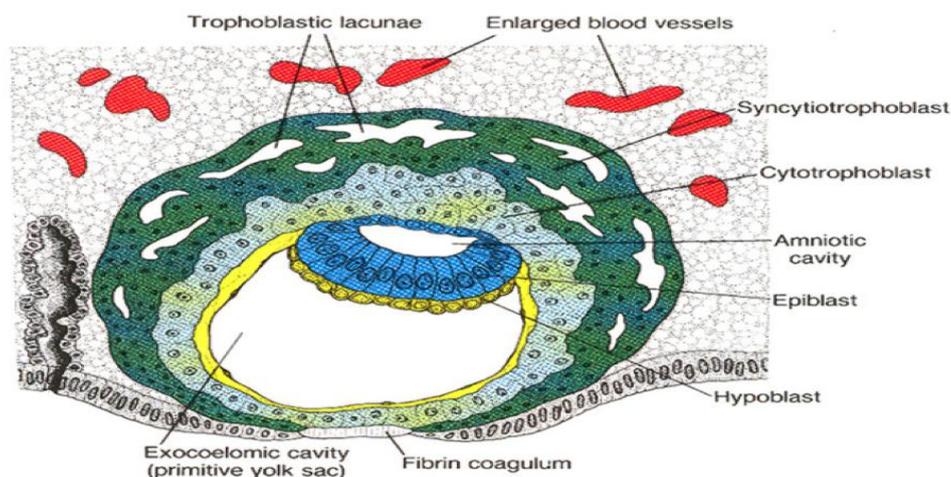
- one cavity called "**Blastocyst cavity**"
- one inner cell mass "**Embryoblast**"
- one outer cell mass "**Trophoblast**" -

## At the beginning of the 2nd week

► The inner cell mass differentiates into 2 layers:

1. Upper one called **Epiblast**
2. Lower one called **Hypoblast**

These 2 layers are called "**Bilaminar embryonic disc**" and are considered to be the beginning of the embryo to be



**Figure 4.3** A 9-day human blastocyst. The syncytiotrophoblast shows a large number of lacunae. Flat cells form the exocoelomic membrane. The bilaminar disc consists of a layer of columnar epiblast cells and a layer of cuboidal hypoblast cells. The original surface defect is closed by a fibrin coagulum.

► Then 2 cavities formed:

1. **Yolk sac** (or primary yolk cavity).
2. **Amniotic cavity** within the epiblast .

**Note:** the syncytiotrophoblast is the invaders, the ones that will go through a lot of changes during the second week.

# Events during second week of Pregnancy

▶ Trophoblast also divides (differentiates) into two types of cell:

1. The cells that each one of them has a cell membrane and a nucleus.
2. Another cells, that are scattered like a mass and there are multi-nucleotide with protoplasmic mass BUT there is no cell membrane.



WHY?? Because they want to reach the blood of the mother.

\*The **Syncytiotrophoblasts** due to their speed of meiotic division, spaces occur in between, when the spaces unit, they will be called "**Trophoblastic lacunae**".

\*When Trophoblastic lacunae and syncytiotrophoblast approaching (or going deep towards) the blood vessels of the mother, capillaries will dilated and congested with the blood.

Capillaries name become **sinusoids** (dilated blood vessels)

## DAY 9 main events:

\**Remember:* here the **endometrium** is in the secretory phase.

1. Blastocyst embedded deeply in **endometrium**.
2. Syncytium show small fluid-filled cavities (contain mixture of maternal blood and endometrial glands secretion).
3. Embryonic disc now lies between **Amniotic cavity** and primitive **yolk sac** cavity.
4. The **amniotic cavity** since it is enlarged, the **cytotrophoblasts** will form a new cells to line the cavity (the amniotic cavity) from left and right and superior -> they form the **Amnioblasts, which** forms a thin membrane "**Amnion**".

-> The **Amnion** surrounds the cavity EXCEPT its floor that's formed by **Epiblast**.

Question

When does the embryo bilaminar disc is secured? And why?

-At day 9, when trophoblastic lacunae formed which contain mixture of maternal blood and endometrial glands secretion.

-so that the embryo can receive nutrients.

# Events during second week of Pregnancy

***The Dr said this is NOT INCLUDED IN THE EXAM***

The role of the Hypoblast:

- The hypoblast cells will migrate to line the **yolk sac** to form the **outside space membrane** (Outside the embryo).
- The hypoblast cells (ectoderm to be) and the epiblast (endoderm to be) will differentiate and invade the cytotrophoblast to form **Mesoderm** (Extra embryonic mesoderm).



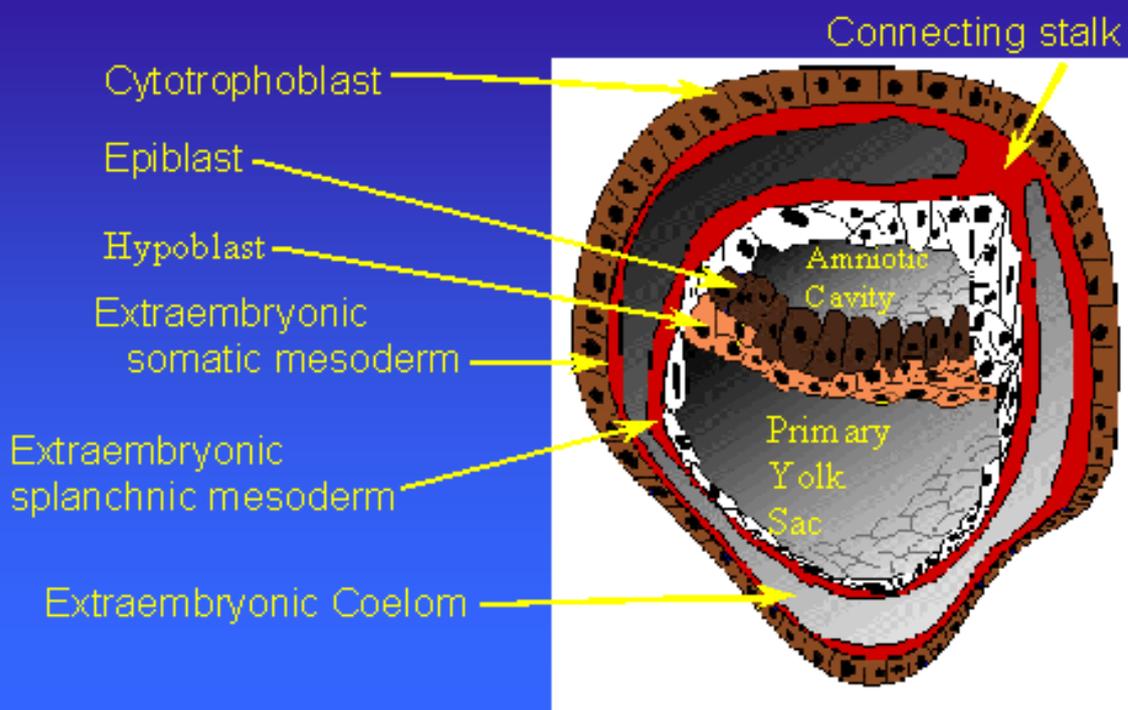
- Also the mesoderm will differentiate fast → spaces occurs in between → spaces will unit with each other completely (EXCEPT FROM ONE POINT) around the embryo to form one space called "**Chorionic Cavity**".

Also called placental cavity

Extra embryonic coelom

This area is called "**the connecting stalk or umbilical cord to be**". The embryo will be hanged from it.

## Week 2: Early Development



# Events during second week of Pregnancy

## DAY 11 AND 12 MAIN EVENTS:

*\*Remember:*

Within the syncytiotrophoblast spaces are formed then they will unit with each other to form a larger space called "Trophoblastic Lacunae"

\*after that the trophoblastic lacunae will communicate with maternal sinusoids (maternal blood).



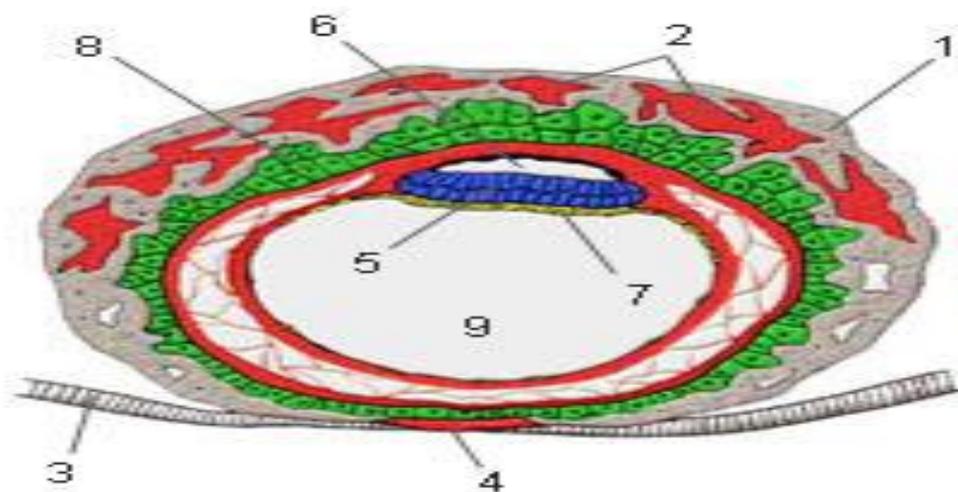
▶ This communication is called **intercommunicating lacunaer network** [Uteroplacental circulation].

⊕ The importance of this communication?

The mother blood will enter inside the embryo through the Trophoblastic lacunae.

⊕ Why do we need the mother's blood in spite the fact that nutrients reach the baby??

Because the nutrients are not enough for the enlargement and nourishment of the embryo. So by establishing the "uteroplacental circulation" the embryo is secured and the blood can enter and feed the baby.



# Events during second week of Pregnancy

► Notice that:

The connecting stalk (umbilical cord to be) appears between the embryonic disc and the trophoblast.

## DAY 13 MAIN EVENTS

1. Visible and clear connecting stalk (umbilical cord to be).
2. Amnion clearly visible.
3. Bilaminar disk is visible.
4. The circulation becomes between the mother and the baby.
5. The cytotrophoblast gives finger like process that will invade the syncytiotrophoblast.

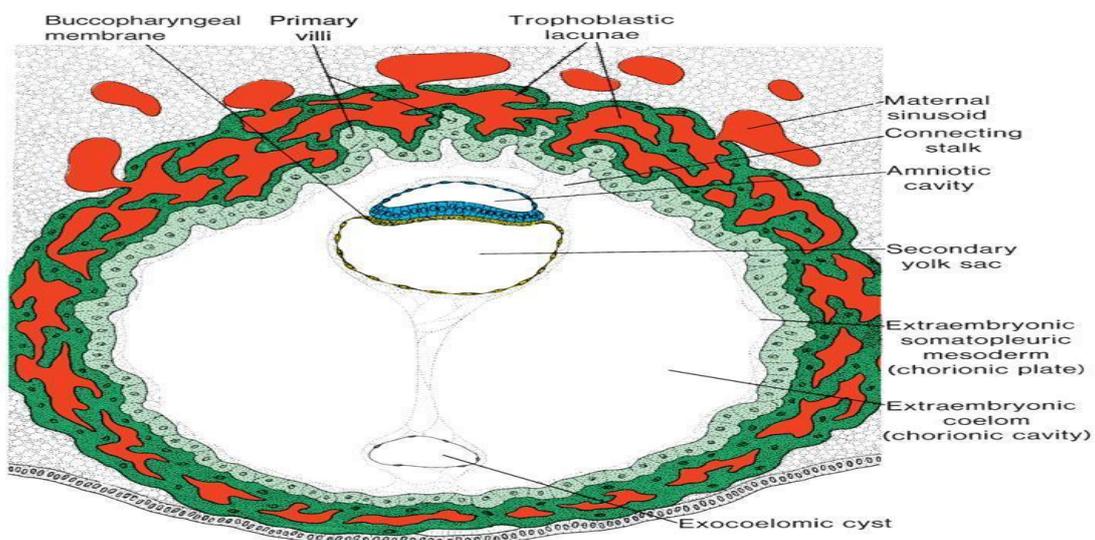
These finger-like process

From inside their cord formed by cytotrophoblast .

Surrounded by: syncytiotrophoblast.

Their importance: reach the mother blood.

Their name: **Primary placental villi** and they will be separated from the mother.



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# Events during second week of Pregnancy

▶ This membrane which is double (Synsyntrophoblast and cytotrophoblast which is separated from maternal blood) is highly selectively permeable  
 --> but some of the viruses can penetrate (such as: German measles, chickenpox, smallpox). While Bacteria can't penetrate.

Remember:  
 Implantation is completed at  
 day 14

▶ So at the end of the second week:

1. Endometrial implantation defect will be healed.

2. Bleeding occasionally occurs at implantation site (DAY 28 of the normal cycle) due to rapid invasion of the cytotrophoblast and syncytiotrophoblast.

- Due to this bleeding the lady might think that the menstrual cycle starts, but this is just another show of implantation (pregnancy).

**Note:** When we count the 9 months for the pregnant lady from her last period we say  $\pm$  2 weeks because this bleeding may be Show or false show.

3. Cellular columns form cytotrophoblast invade syncytiotrophoblast to give **primary chorionic villi**. And at this time the exchange of nutrients between the mother and the baby start.

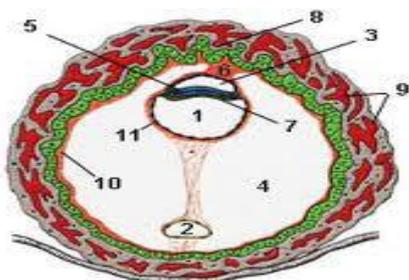
-Then the connecting stalk will go through vascularization as a result arteries and veins formed .Its name after the vascularization: **umbilical cord** and it's clearly visible.

\*\*It is like 2 bubbles inside one bubble:

#5: epiblast

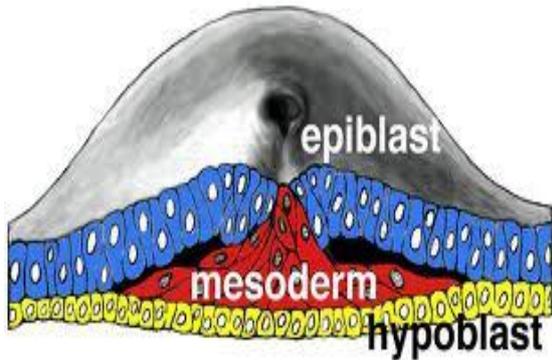
#7: hypoblast

Bilaminar embryonic disc.



Connecting by: stalk  
 #1: secondary yolk sac.  
 #4: Chorionic cavity (Extra embryonic cavity).

# Events during second week of Pregnancy



- The embryo contains mesoderm in between Two layers:
  1. Epiblast: ectoderm to be.
  2. Hypoblast: endoderm to be.

So the bilaminar becomes trilaminar (Epiblast, Hypoblast and mesoderm).

"Time is what we want most, but what we use worst."

Lana Makahleh