

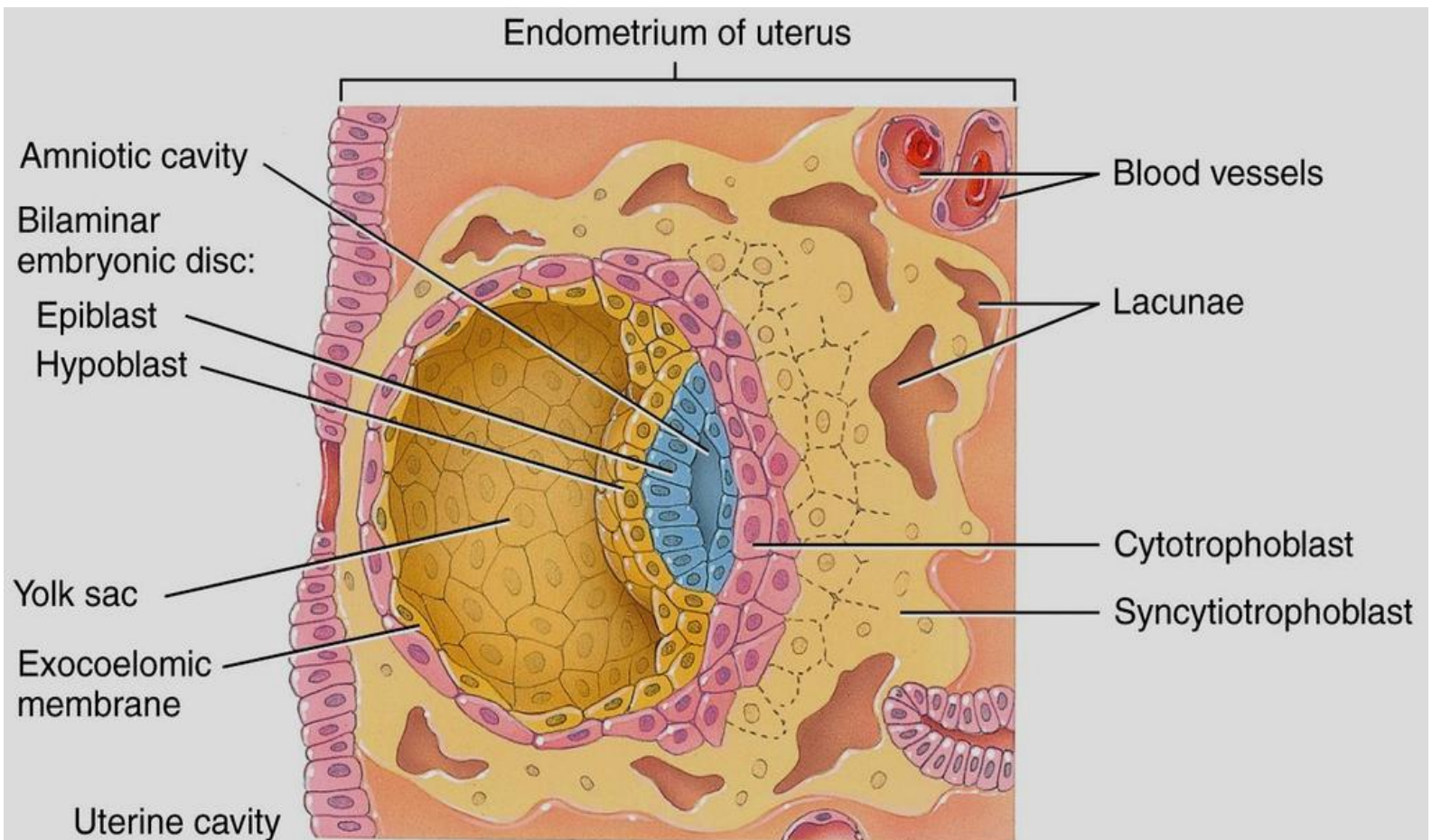
## SECOND WEEK OF DEVELOPMENT

★ The following changes occur during 2<sup>nd</sup> week of pregnancy :

1- **Completion of implantation** by 11<sup>th</sup> or 12<sup>th</sup> day

2- **Changes in the embryoblast :**

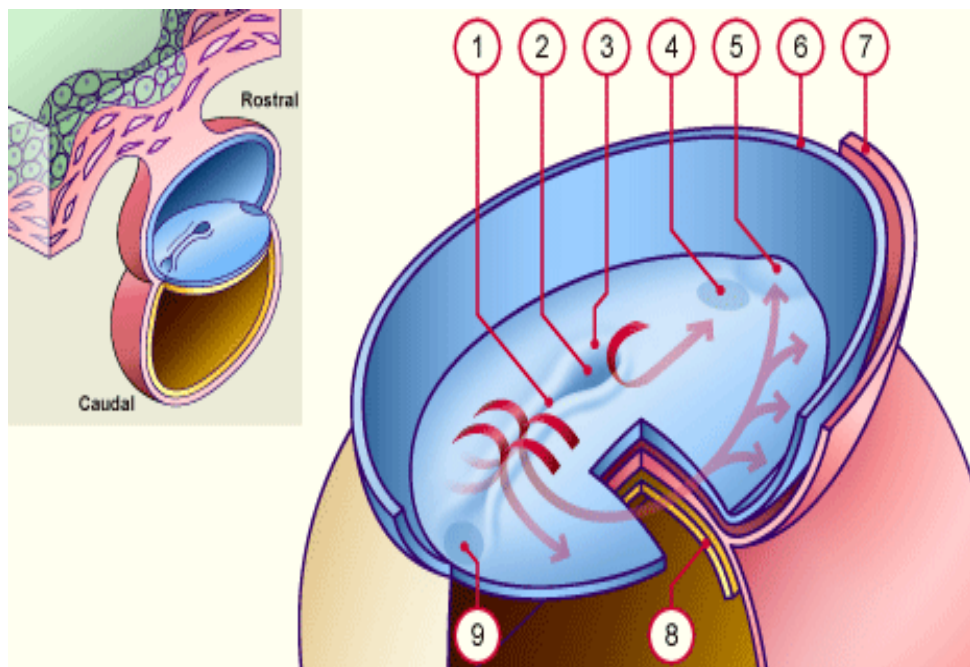
- Formation of the **bilaminar germ disc** (*Epiblast* adjacent to the trophoblast and *Hypoblast* adjacent to the blastocele).
- The germ disc is **rounded or oval** in shape .



(b) Frontal section through endometrium of uterus showing blastocyst, about 9 days after fertilization

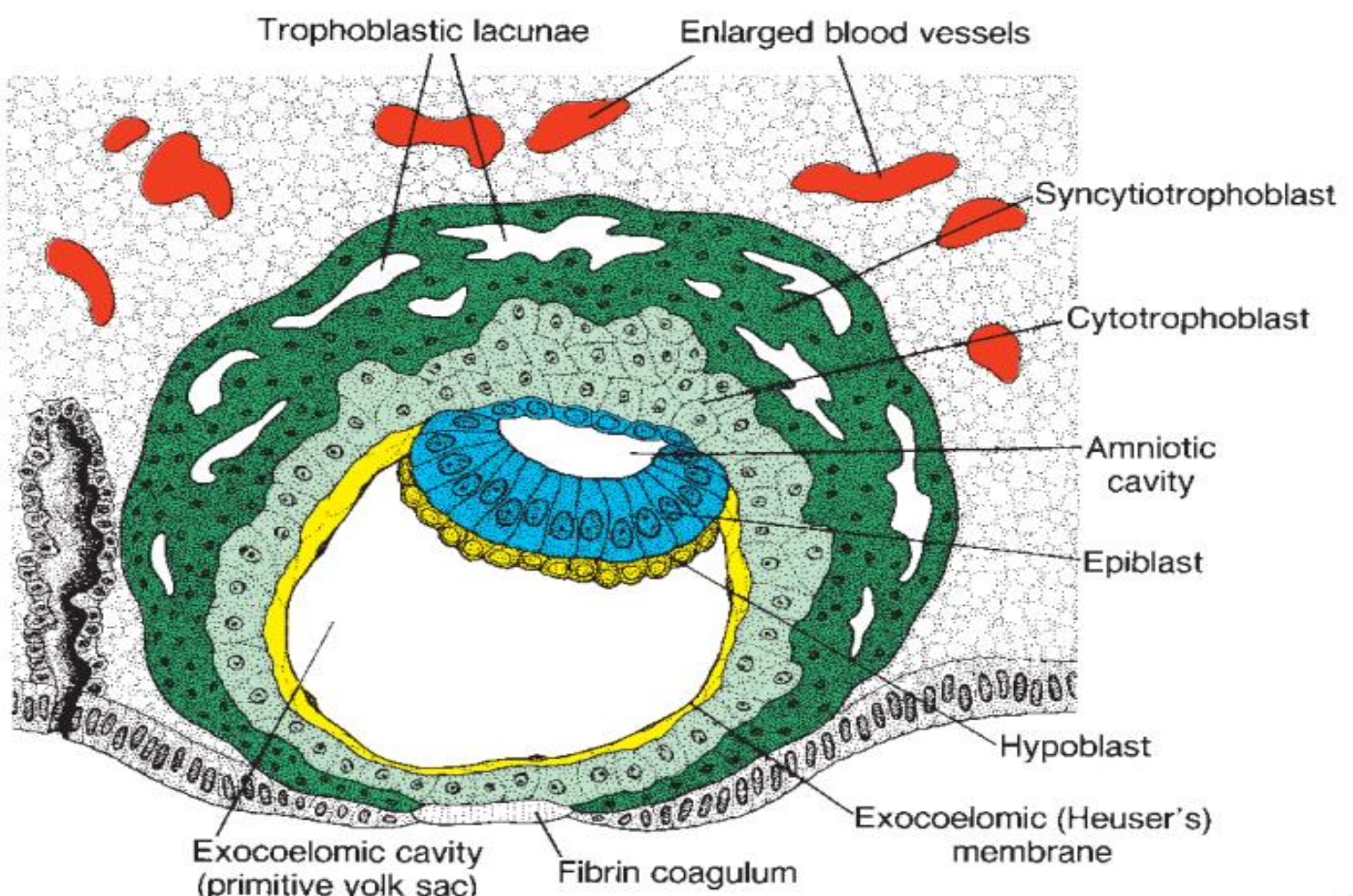
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1. Primitive groove
  2. Primitive pit
  3. Primitive node
  4. Oropharyngeal membrane
  5. Cardiogenic plate
  6. Sectional edge of amniotic membrane
  7. Mesoderm
  8. Endoderm
  9. Future cloacal membrane
- 1+2+3 = primitive streak



### 3- Changes in the trophoblast :

- During 2<sup>nd</sup>. week ,the trophoblast shows **rapid rate of development** as compared to the slow rate of development of the bilaminar germ disc
- The trophoblast is **differentiate** into an outer ***syncytiotrophoblast*** and an inner ***cytotrophoblast***.
- ***Syncytiotrophoblast:***
  - It is formed of a **multinucleated** zone **without** distinct cell **boundaries**.
  - **Small spaces** appear & coalesce (at the 9<sup>th</sup> day) in the syncytiotrophoblast , at the **embryonic pole** first then spread all over the syncytiotrophoblast , to form **trophoblastic lacunae (lacunar stage)**.
  - At the 11<sup>th</sup> & 12<sup>th</sup> days, the syncytiotrophoblast **erodes the maternal sinusoids** and its lacunae are filled with maternal blood & uterine secretions which begins to flow through the trophoblastic lacunae establishing the **utero-placental circulation** which allow nourishment of the germ disc & change of gases & metabolites.
  - At the end of 2<sup>nd</sup> week , **1ry. Chrionic villi** appears at the embryonic pole .
- ***Cytotrophoblast:*** Its cells maintain their cell walls. They divide externally to produce more syncytiotrophoblast.



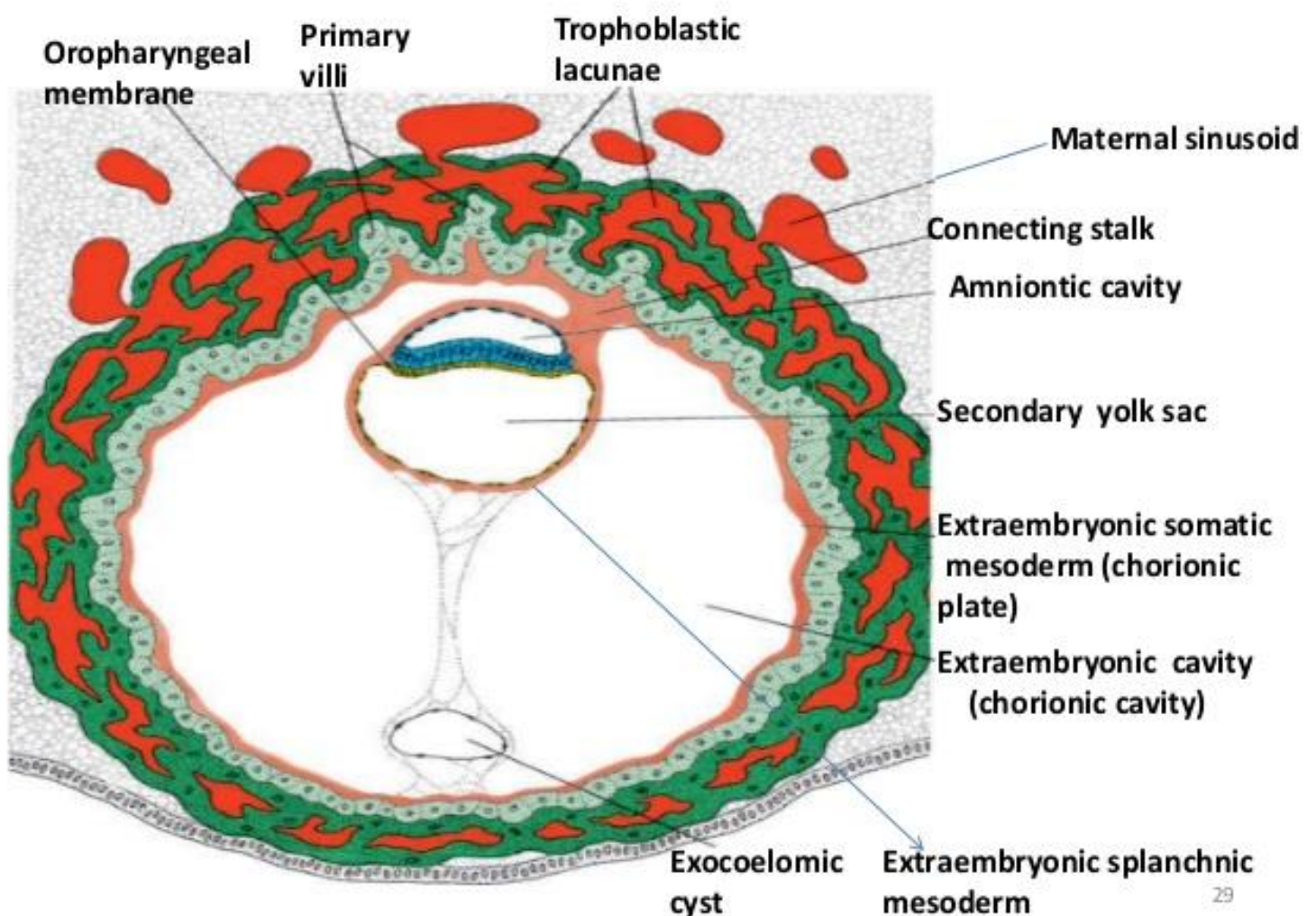
#### 4 – Formation of 2 cavities :

##### a) **Amniotic cavity** : (8<sup>th</sup> day)

- It is a **space appears between** the epiblast and the cytotrophoblast
- The epiblast cells form a layer of flat cells called **amnioblasts** which form the **roof** of the amniotic cavity while its **floor** is formed by the epiblast .

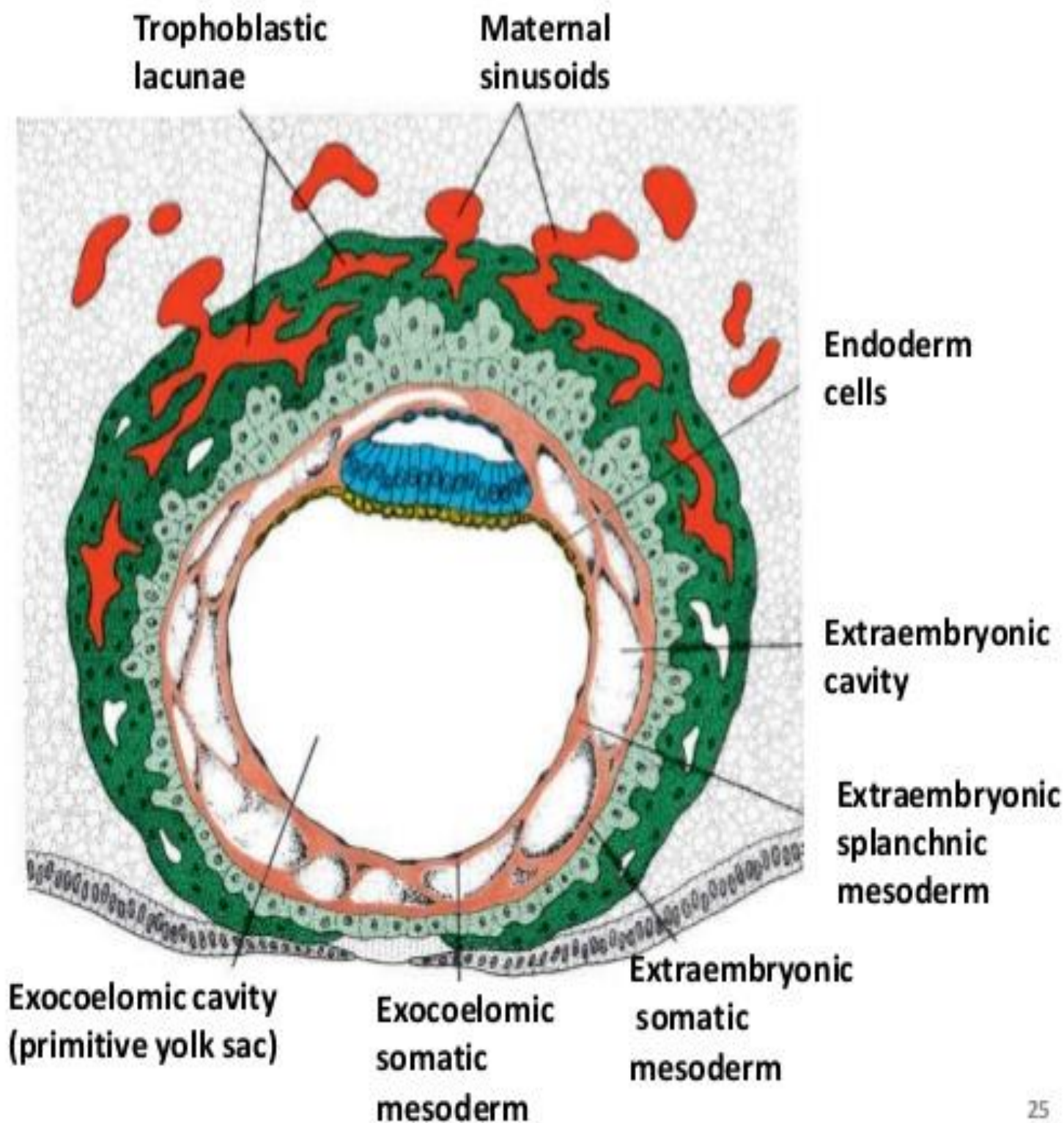
##### b) **Primary yolk sac** : (9<sup>th</sup> day)

- The **hypoblast cells** form a layer of flat cells to form a membrane , which line the blastocele , called **Hauser's membrane**.
- The **space between** the hypoblast and the Hauser's membrane is called the **1ry yolk sac** , which replaces the blastocele , with its **roof** is the hypoblast and the remaining part of its **wall** is formed of Hauser's membrane .
- The hypoblast produces additional **cells that migrate inside** the Heuser's membrane. These cells proliferate and gradually form a new cavity known as the **secondary yolk sac** (day 13).



### 5-Extraembryonic mesoderm:

- These are cells **derived from** the yolk sac cells appear and form very loose tissues **between** the **cytotrophoblast** externally and the the **yolk sac** internally.
- **Cavities appear** & coalesce , in the extra-embryonic mesoderm , forming a single large cavity called the **extra-embryonic coelom** (or **chorionic cavity**).



- The extra-embryonic mesoderm is **divided** by the extra-embryonic coelom (chorionic cavity) into:
  - a. ***Extraembryonic somatopleuric mesoderm*** which line the cytotrophoblast .
  - b. ***Extraembryonic splanchnopleuric mesoderm*** which cover the yolk sac.
  - c. ***Connecting stalk*** : ( future umbilical cord ) It is the extra-embryonic mesoderm **connecting** the roof of amniotic cavity with the over lying cytotrophoblas . It is found **dorsal to the amniotic cavity**.
- The cytotrophoblast + Syncytiotrophoblast + Extraembryonic mesoderm are called **Chorion** . The blastocyst is now called the ***Chorionic vesicle*** (at the 12<sup>th</sup> day).

★ **N.B : Please see this excellent video .**

<https://www.youtube.com/watch?v=bIdJOiXpp9g>