أهلا وسهلا

الأستاذ الدكتور يوسف حسين

أستاذ التشريح وعلم الأجنة - كلية الطب – جامعة الزقازيق – مصر

رئيس قسم التشريح و الأنسجة و الأجنة - كلية الطب - جامعة مؤتة - الأردن

دكتوراة من جامعة كولونيا المانيا

اليوتيوب Dr. Youssef Hussein Anatomy

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Formation of Bilaminar germ disc

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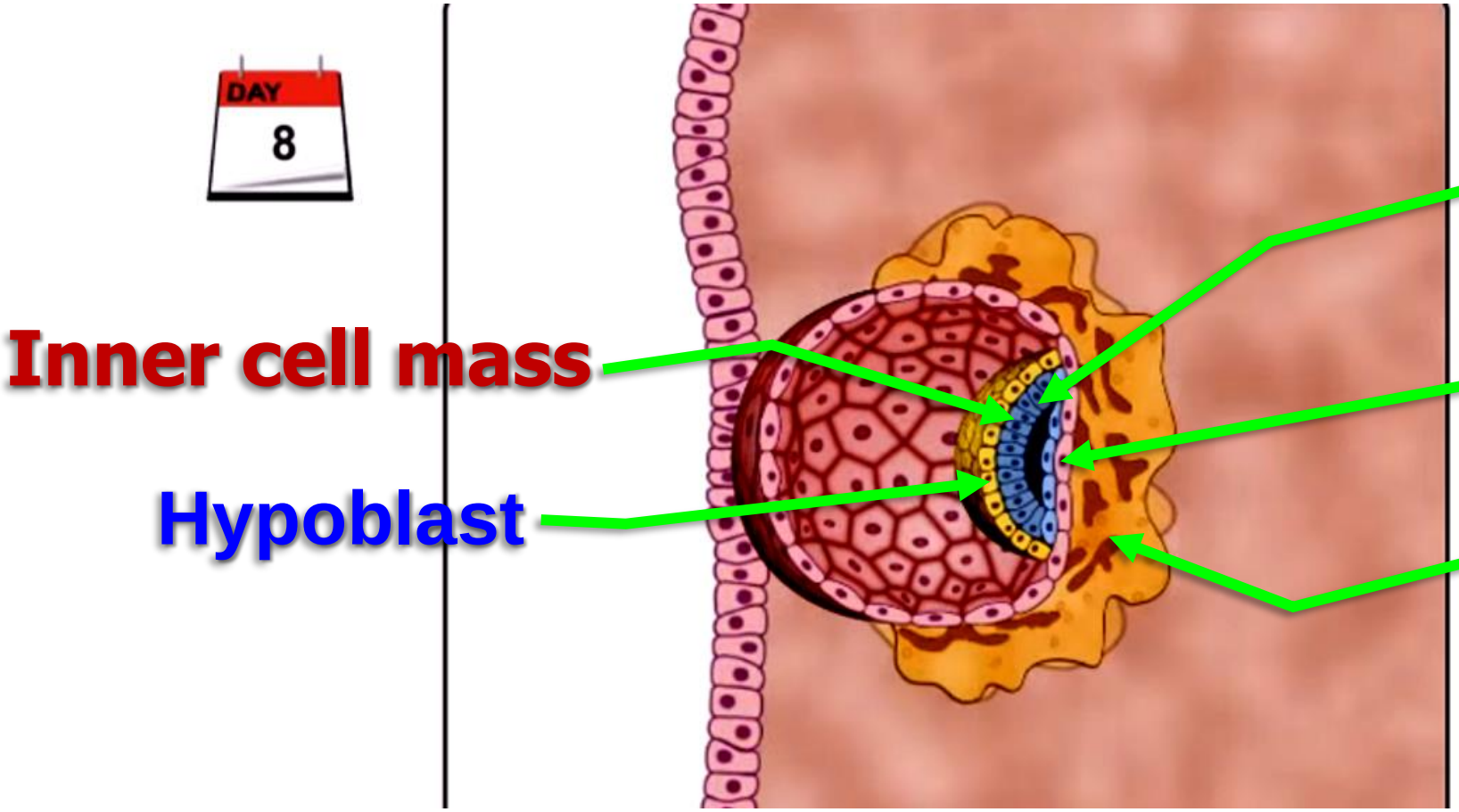

- The inner cell mass (**Embryoblast**) of the blastocyst proliferates and takes shape of flat circular disc.
- The cells are differentiated into 2 layers:

1. Dorsal columnar layer **(Ectoderm)** called **epiblast.**

2. Ventral cuboidal layer **(Endoderm)** called **hypoblast.**

2 Cavities

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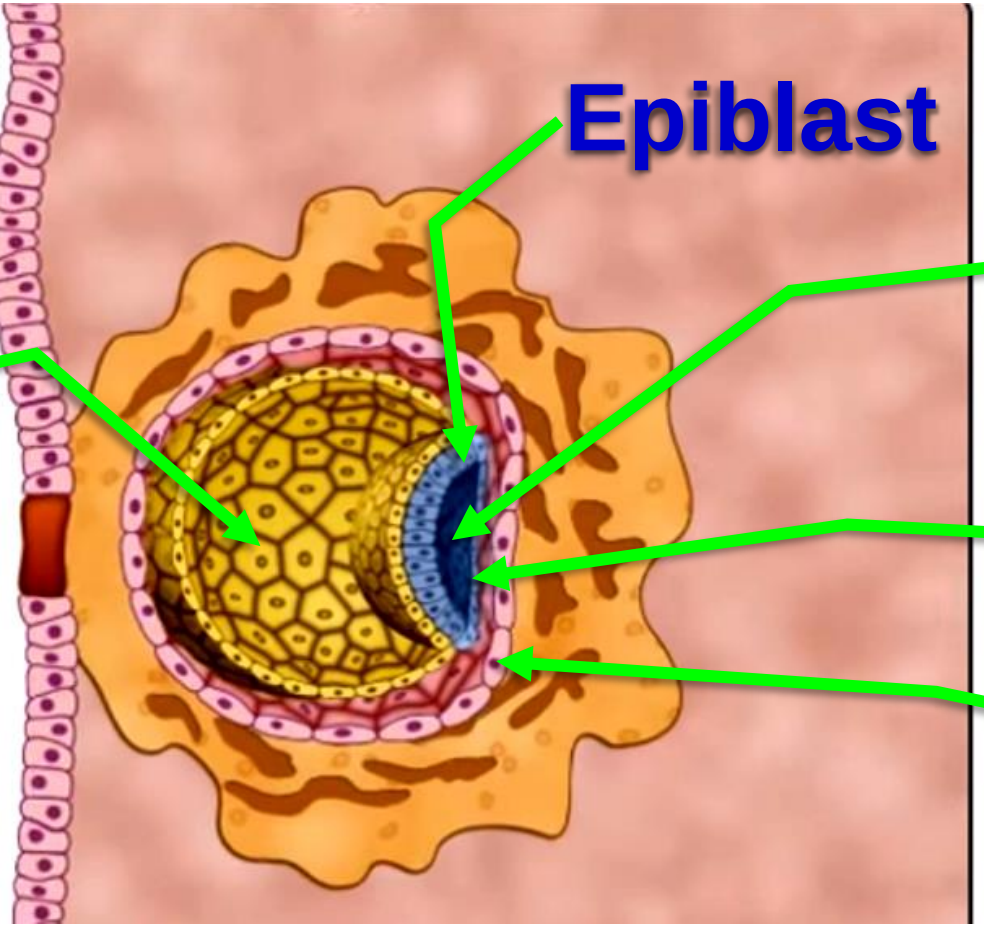
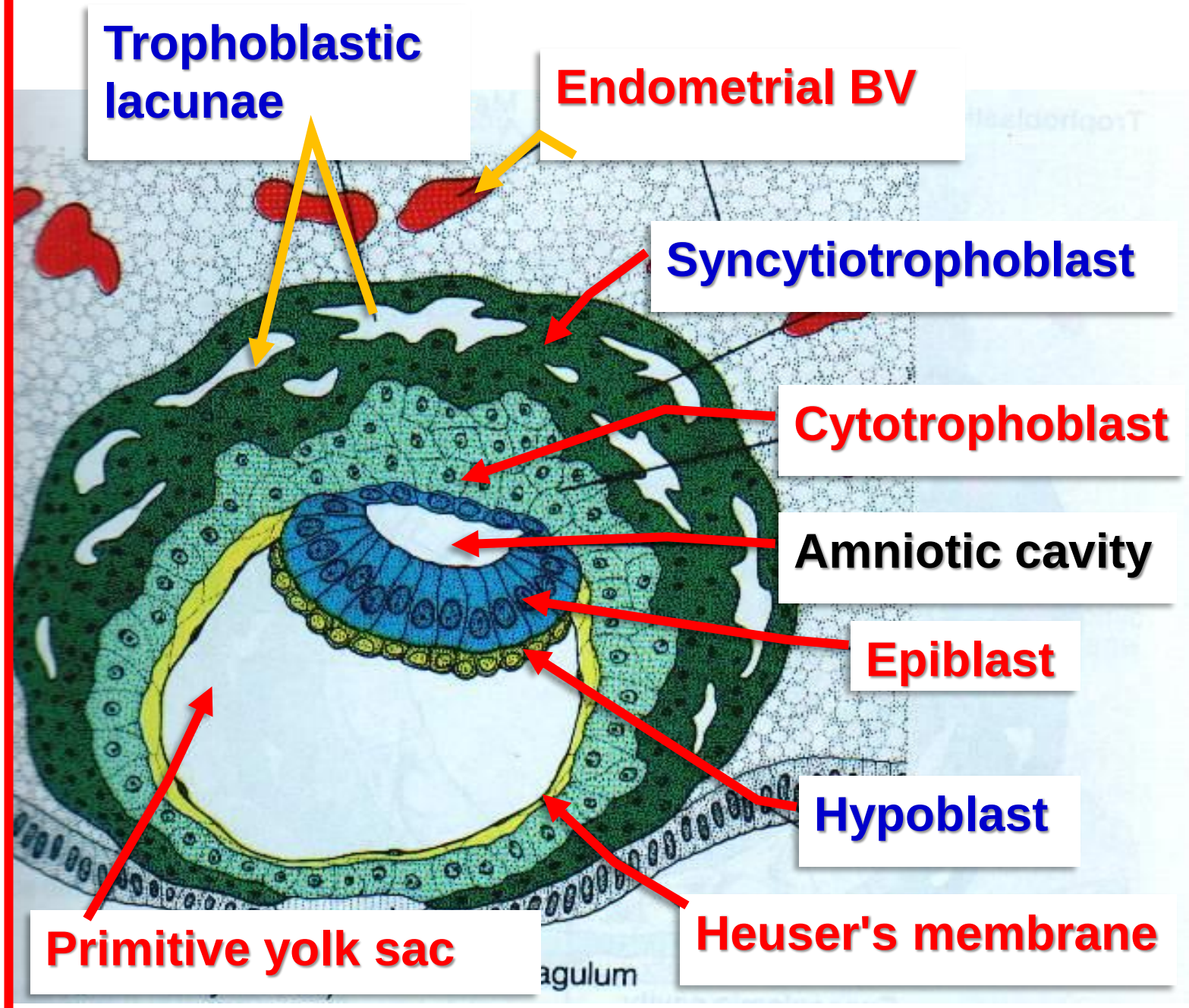


Blastocele
Cavity of blastocyst

- A small cavity appears within the **epiblast**. This cavity enlarges to become the **amniotic cavity**.
- Epiblast cells adjacent to the **cytotrophoblast** are called **amnioblasts.**
- The cells secret amniotic fluid

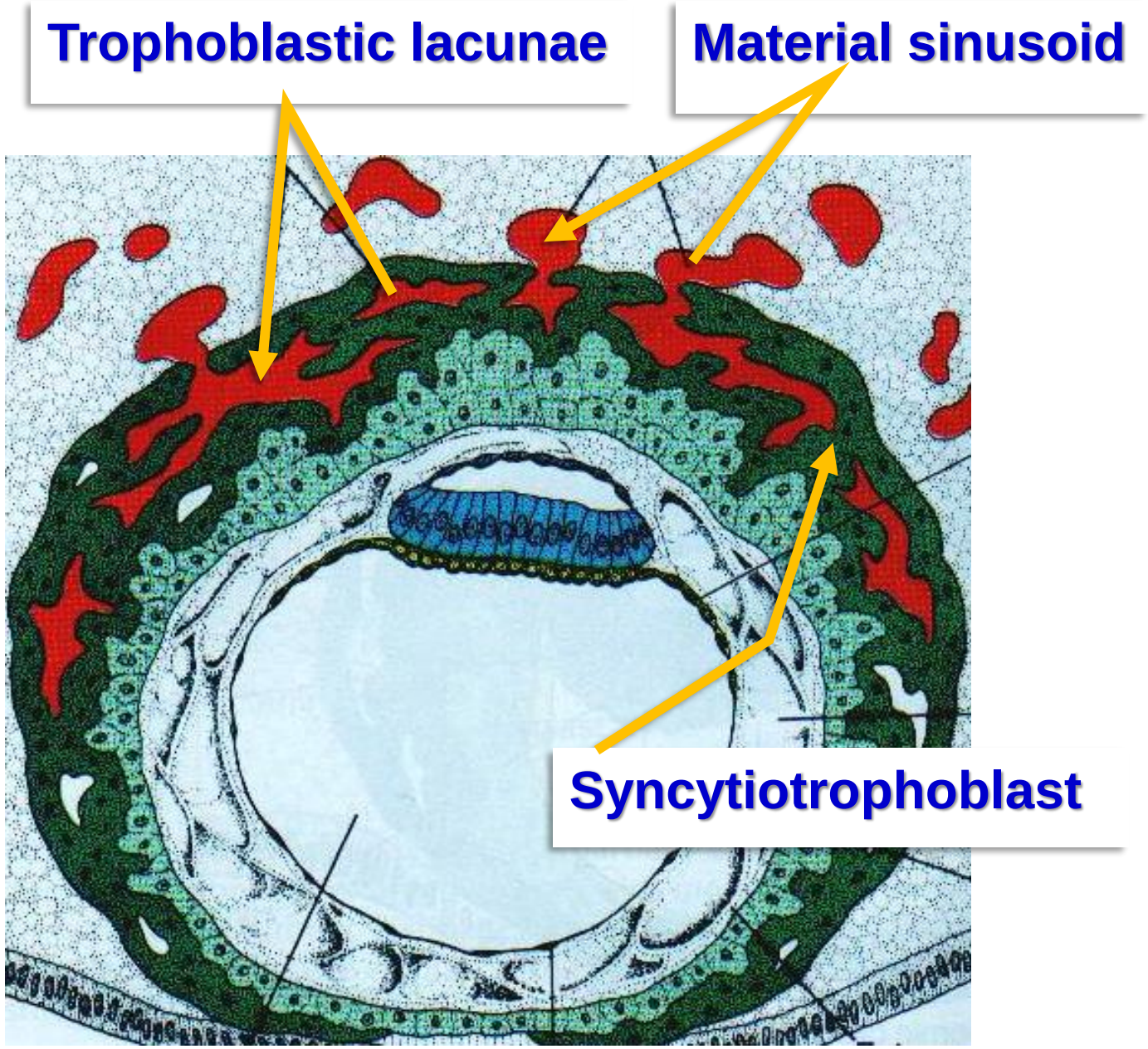
- **Day 9**

- **Blastocele (**cavity of blastocyst) is lined by a new membrane **exocoelomic (Heuser's) membrane that** is formed by flattened cells **originate from hypoblast.**
- The cavity is now called **exocoelomic cavity or primitive yolk sac.**
- **Trophoblastic lacunae** appeared in syncytiotrophoblast at embryonic pole of the disc



• Day 11-12

- The syncytiotrophoblast cells **penetrate** (phagocytosis) deeper into maternal endometrium and **invade its capillaries**
- **T**he lacunae become **filled with maternal blood**
- **S**o, maternal blood begins to flow through **lacunar system** of trophoblast and this is called **uteroplacental circulation.**



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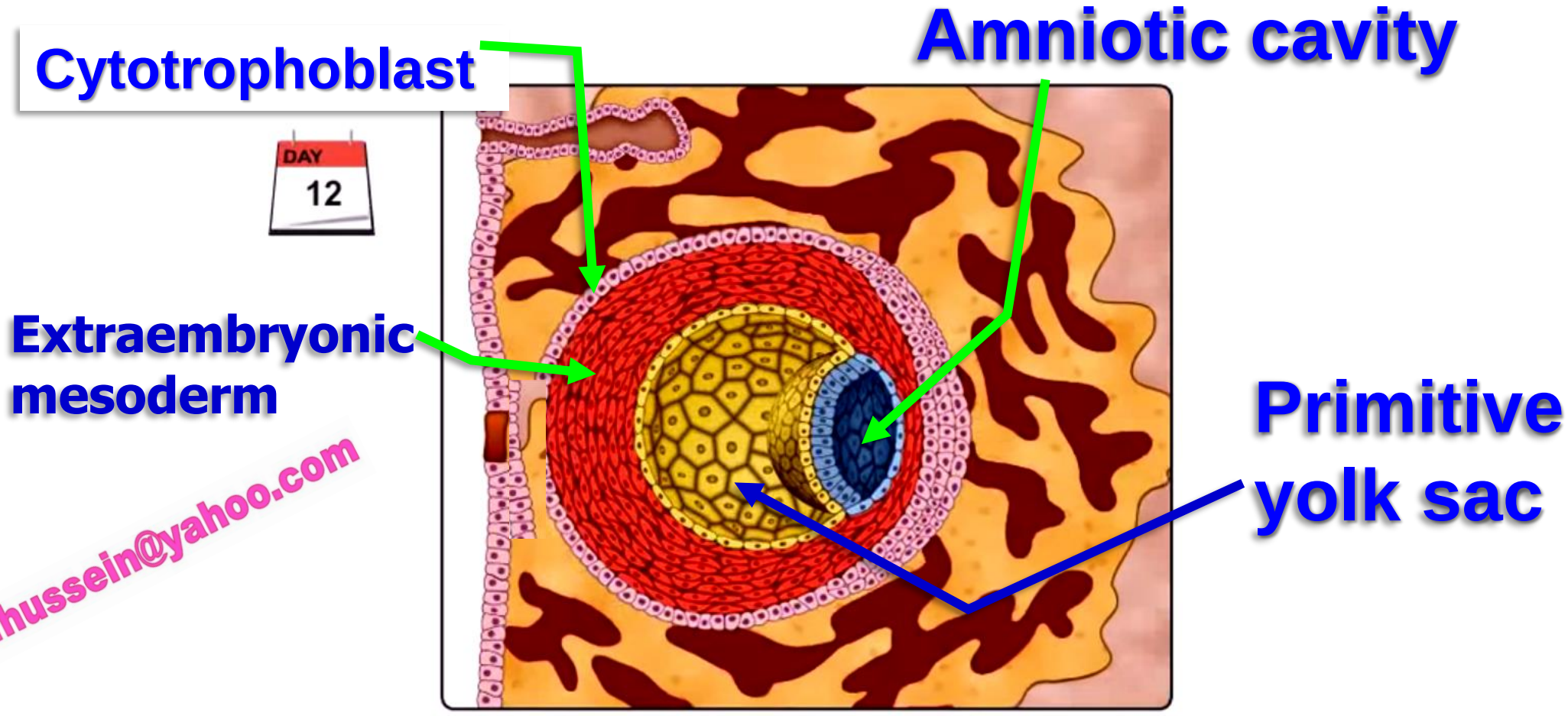
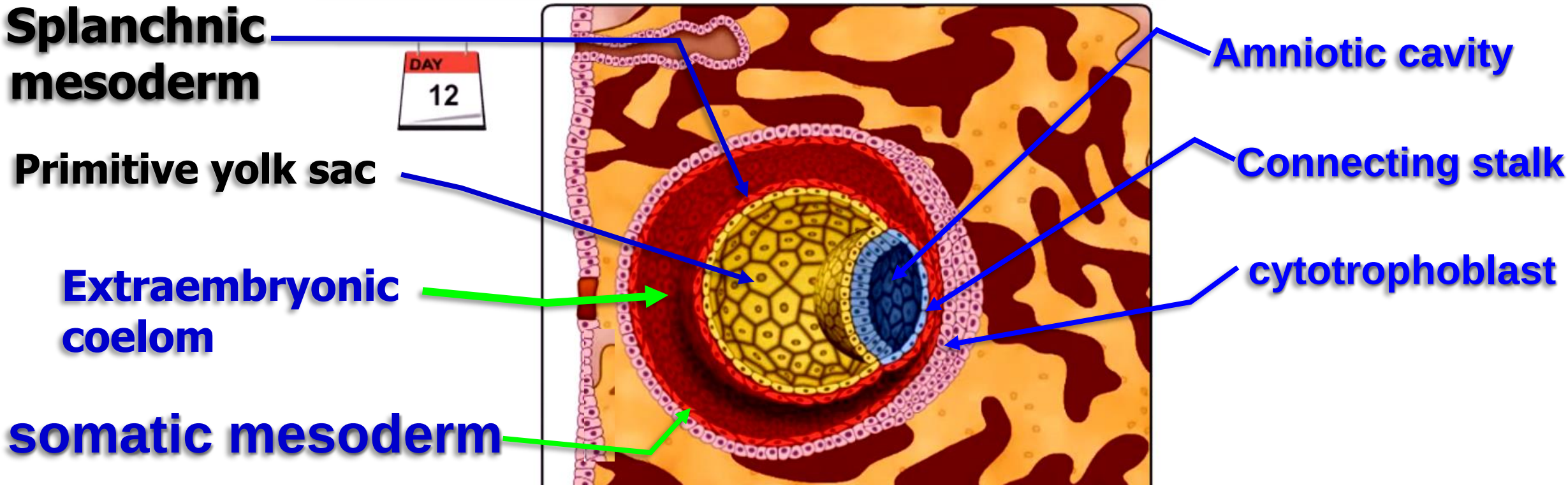
Formation of Chorionic vesicle



- The cytotrophoblast proliferates and forms another layer of cells called extraembryonic mesoderm (E.E.M) separating the cytotrophoblast (externally) from the primitive yolk sac and amniotic cavity (internally).



- **Chorionic cavity (Extraembryonic coelom)**

- It is a large cavity (U shaped) developed within extraembryonic mesoderm**.**

- This cavity divided E. E. M. into 2 layers;

a- **Outer layer (somatic)** lines the trophoblast.

b- **Inner layer (splanchnic)** covering the amniotic cavity and primitive yolk sac.

- The 2 layers connect together at **connecting stalk (**where embryonic disc is connected to cytotrophoblast)

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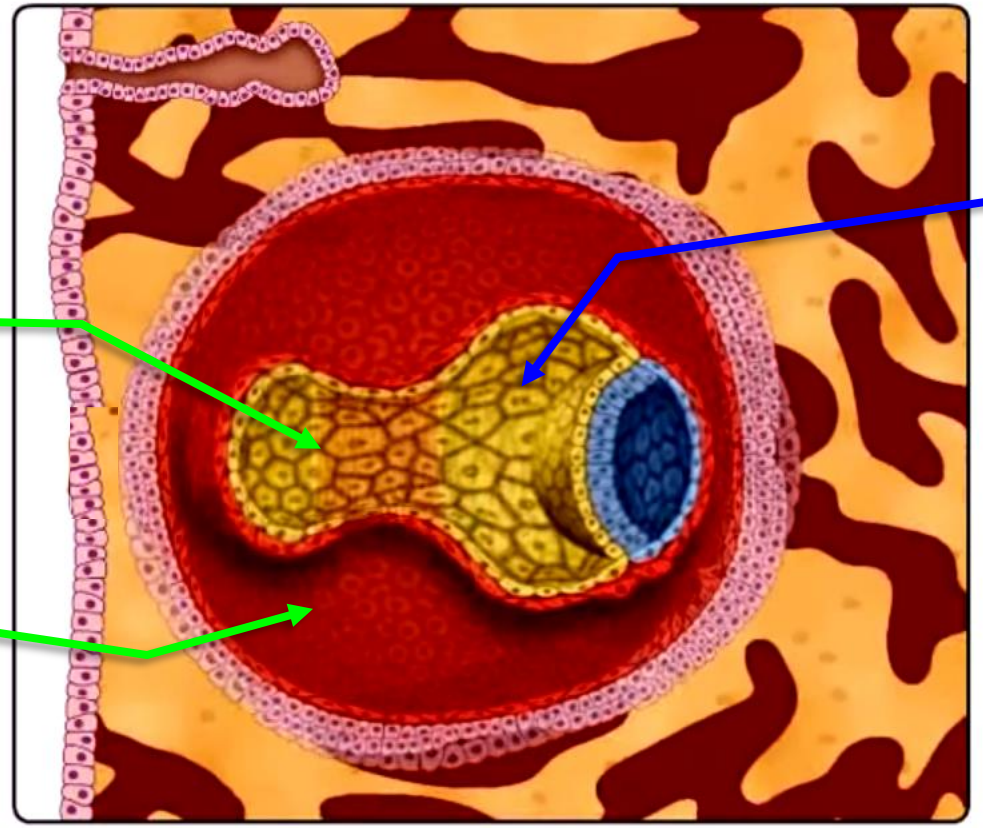
Exocoelomic cyst



Primitive yolk sac

Chorionic cavity

Extraembryonic coelom

- Large portions of primitive yolk sac are pinched off. These portions are represented by exocoelomic cysts, which are often found in the extraembryonic coelom

Exocoelomic cyst

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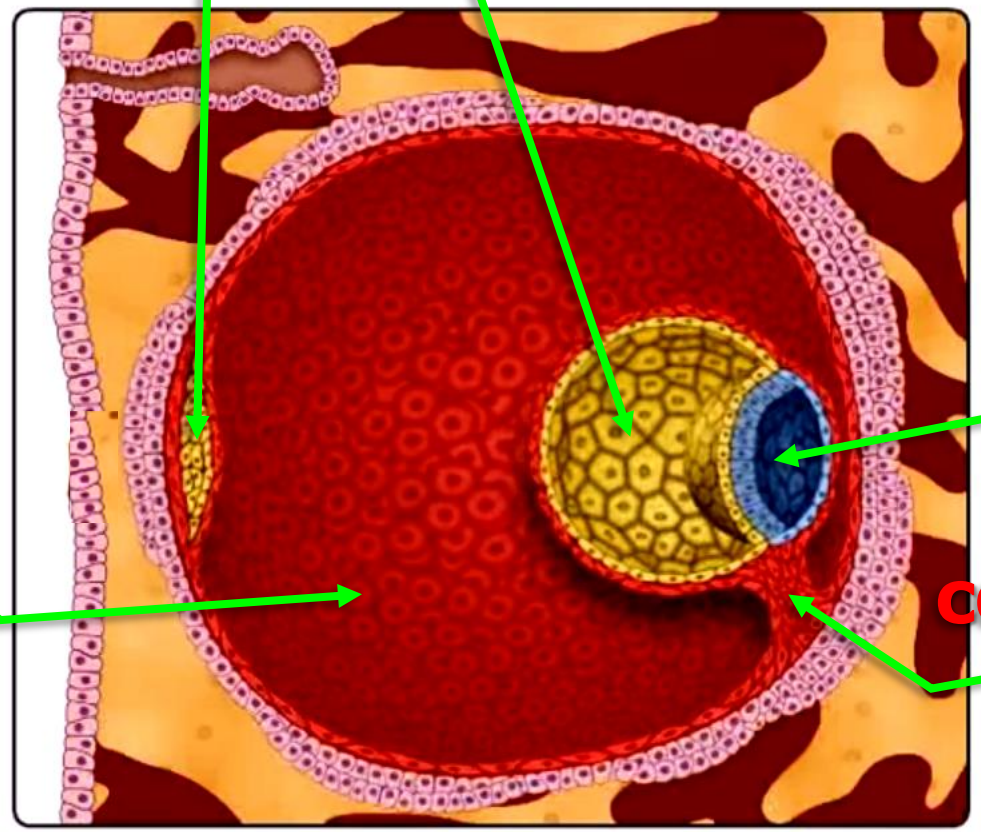
2dry yolk sac



amniotic cavity

Chorionic cavity (Extraembryonic coelom)

connecting stalk

- The **exocoelomic cyst** is separated from the primitive yolk sac
- **The endodermal cells from the hypoblast proliferates and migrates to line the Heuser's membrane forming the secondary yolk sac.**
- **The 2ry yolk sac is completely lined by endoderm.**

13th day

Chorionic Vesicle

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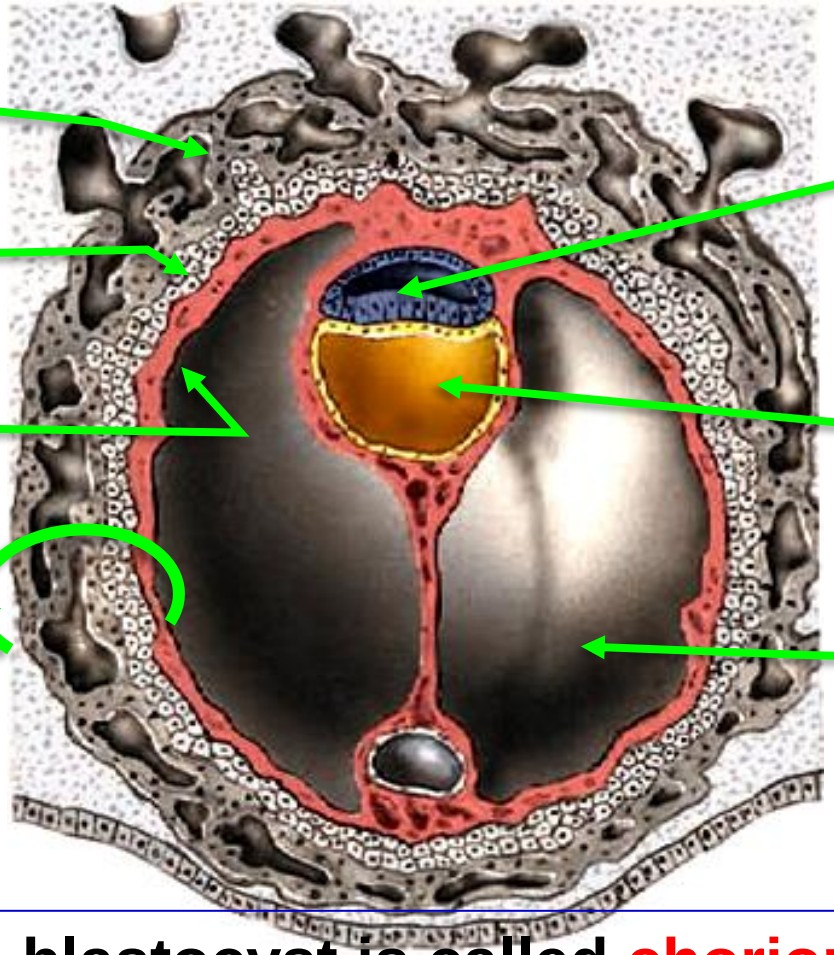

- By the end of 2nd week, The blastocyst is called chorionic vesicle having large cavity called chorionic cavity
- The Chorion (wall) is formed by three layers: 1) Syncytiotrophoblast.

2) Cytotrophoblast. 3) Somatic layer of Extraembryonic mesoderm.

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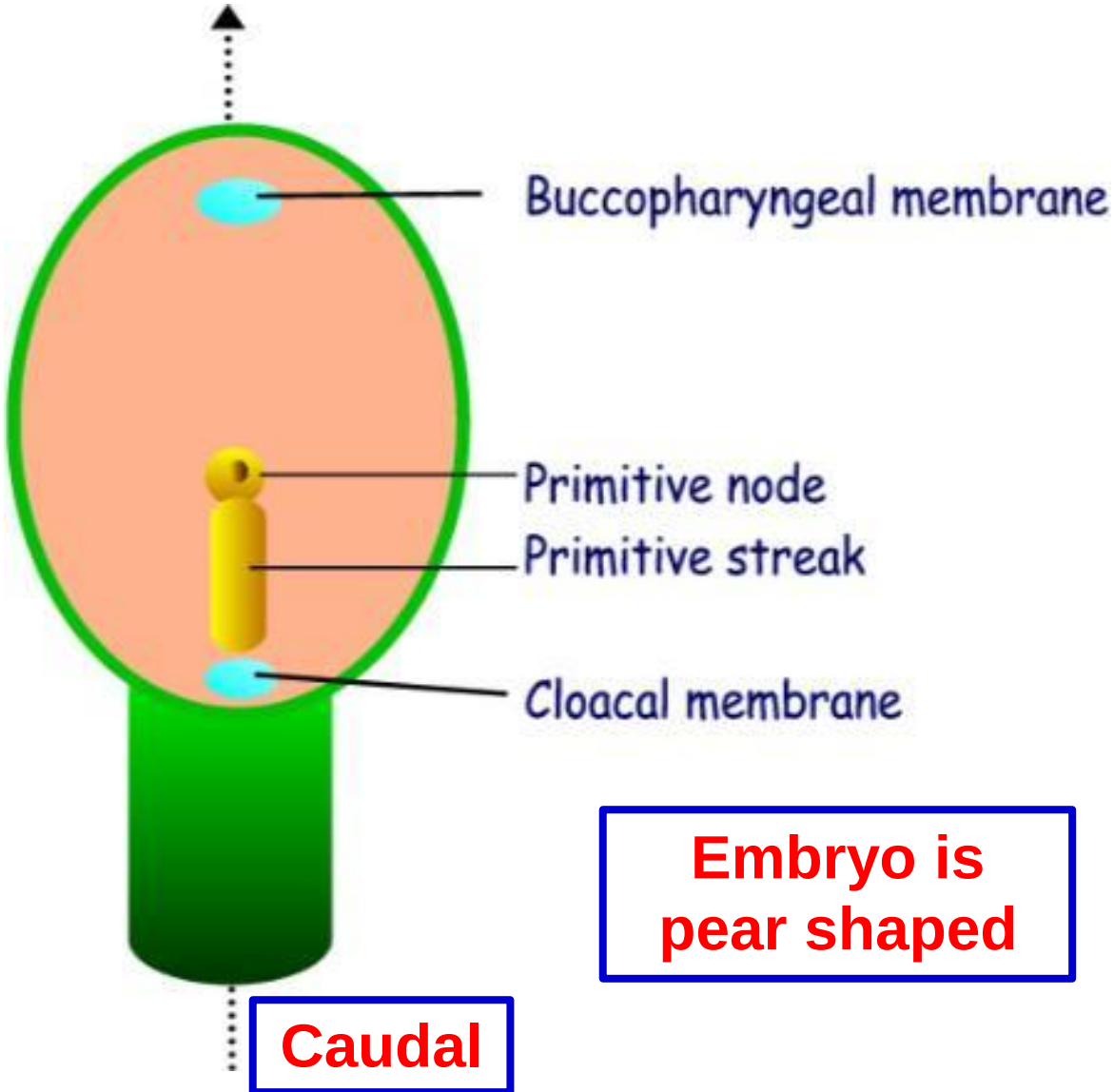
Formation of Primitive streak and node

- **Primitive streak** from proliferation of **epiblastic cells (ectoderm)** in the midline of the caudal half, Its cranial end enlarges to form **primitive node or Hansen's node.**

- A circular thickening appears in the **hypoblast** in the midline near cranial end to form **prechordal plate (buccopharyngeal membrane)**
- A circular thickening appears in **hypoblast** in the midline caudal to primitive streak to form **cloacal membrane**
- Now, the embryo has
  - ❖ Cranial and caudal ends
  - ❖ Dorsal and ventral surfaces
  - ❖ Right and left sides.



Embryo is pear shaped

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Formation of Notochord

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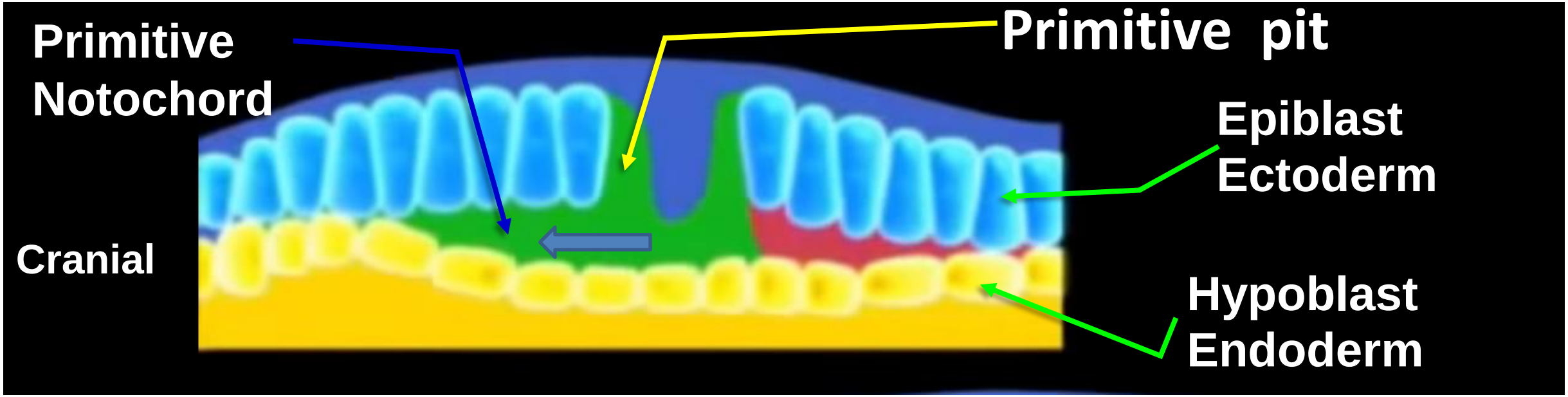
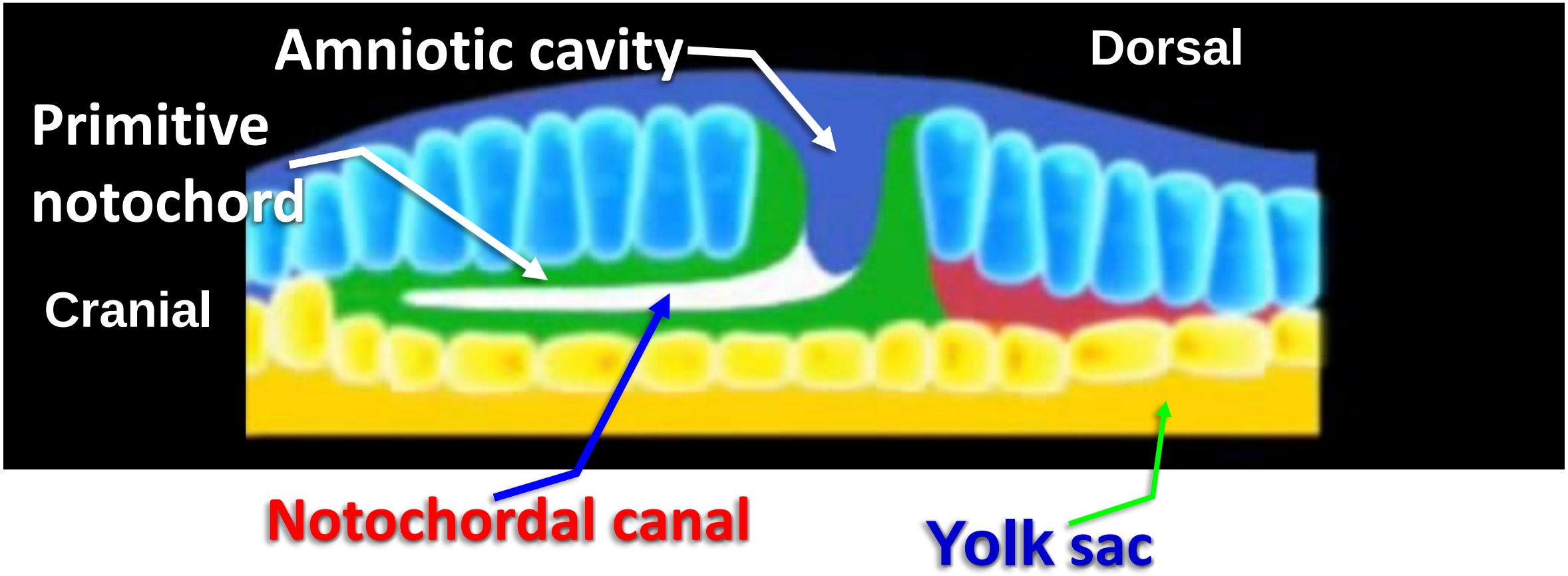


- **Primitive pit** in the primitive node
- The cells of the **primitive pit** proliferate and migrate cranially in the midline between **epiblast** (ectoderm) and **hypoblast** (endoderm) forming **primitive notochord**.
- The notochord stops at prechordal plate (**buccopharyngeal membrane**).



- An **invagination** extends from the **amniotic cavity** into the **primitive pit** then extends into **primitive notochord** forming **the notochordal canal.**

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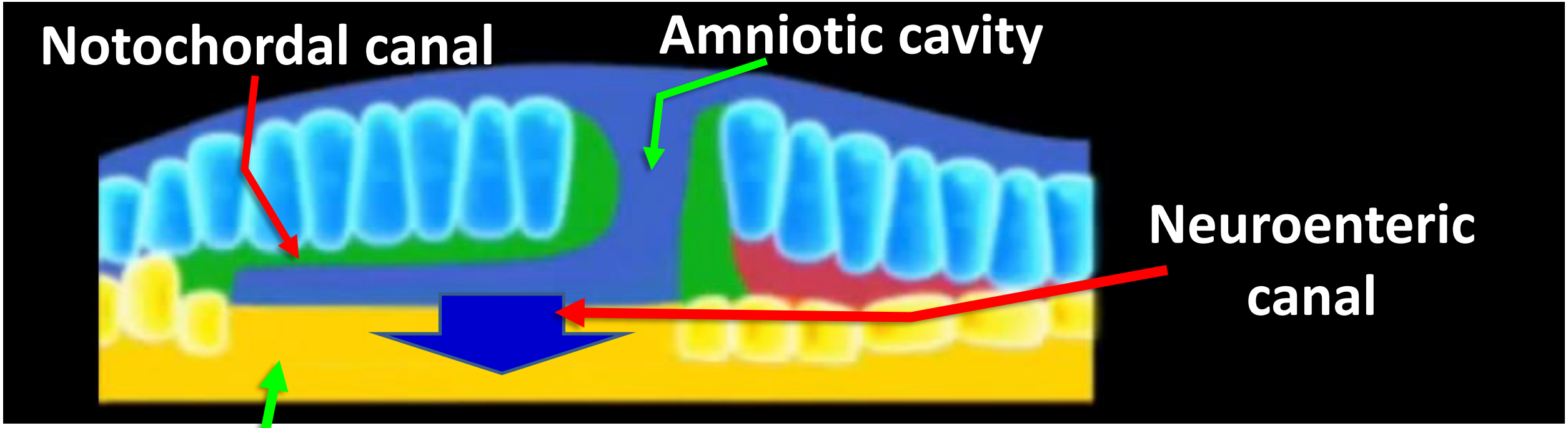

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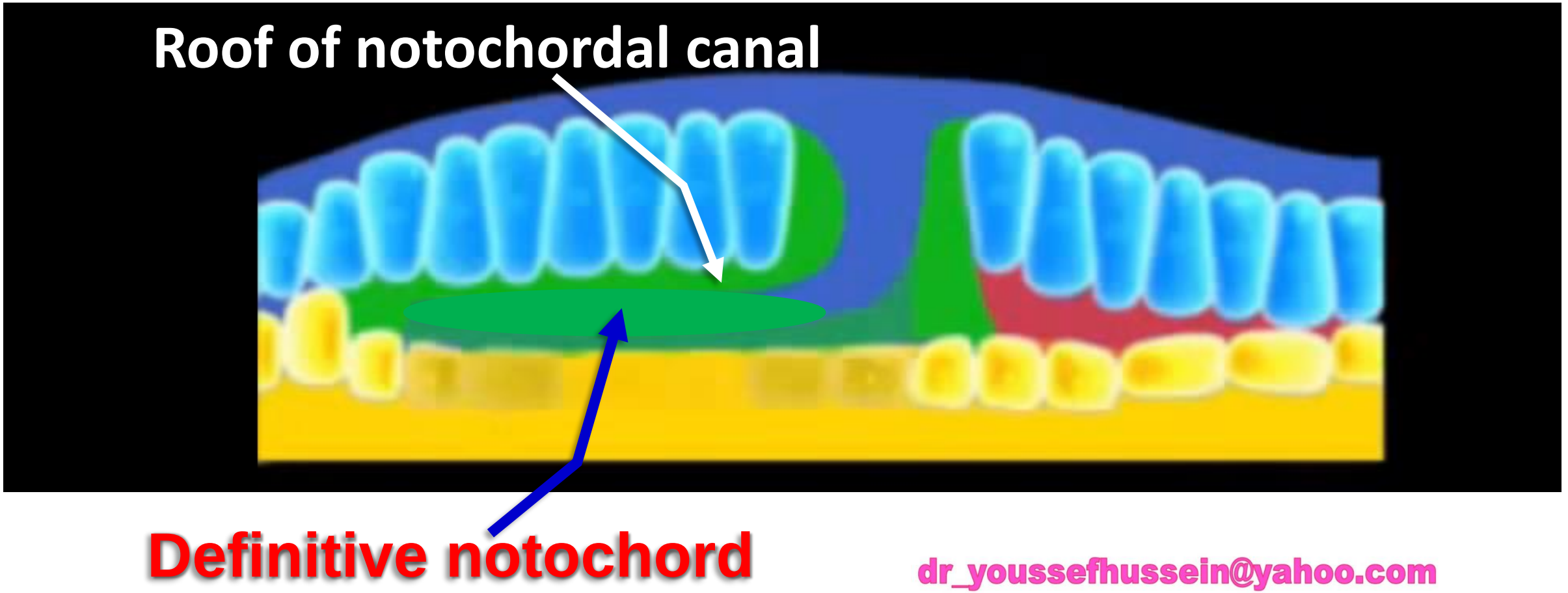
- **Degeneration** of the **floor of the notochordal canal** and **roof of the yolk sac leading to formation of neuroenteric canal**.
- As the result, a **temporarily communication** of the amniotic cavity (dorsal) and the yolk sac (ventral)
- The canal maintains and adjusts the pressure between amniotic cavity and yolk sac



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- The cells of the roof of the notochordal canal proliferate and close the canal forming the definitive notochord.

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• Functions of notochord

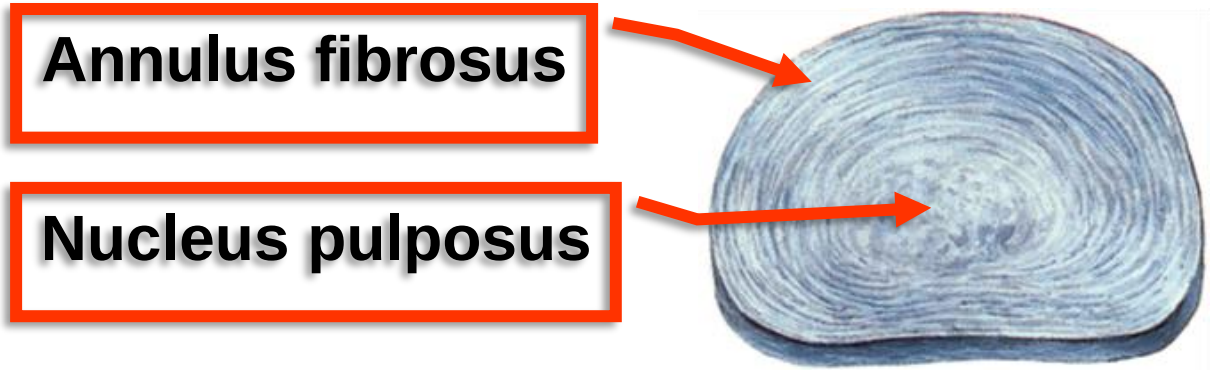
1. It forms **axis skeleton of the embryo** before development of the vertebral column.
2. It secrets signals to stimulate development of **somites** from **mesoderm**.
3. It secrets signals to stimulate development of **neural tube from ectoderm**.

• Fate of notochord

- **Degeneration and disappears** inside bodies of the vertebrae
- The part between the bodies of vertebrae forms the **nucleus pulposus** of the **intervertebral discs**
- Cellular remnants of notochord

give rise to tumors called **Chordoma**

In the axial skeleton



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