أهلا وسهلا

الأستاذ الدكتور يوسف حسين

كلية الطب - جامعة مؤتة – الأردن

دكتوراة من جامعة كولونيا المانيا

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The Third week

Prof. Dr. Youssef Hussein Anatomy - YouTube

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Formation of Primitive streak and node

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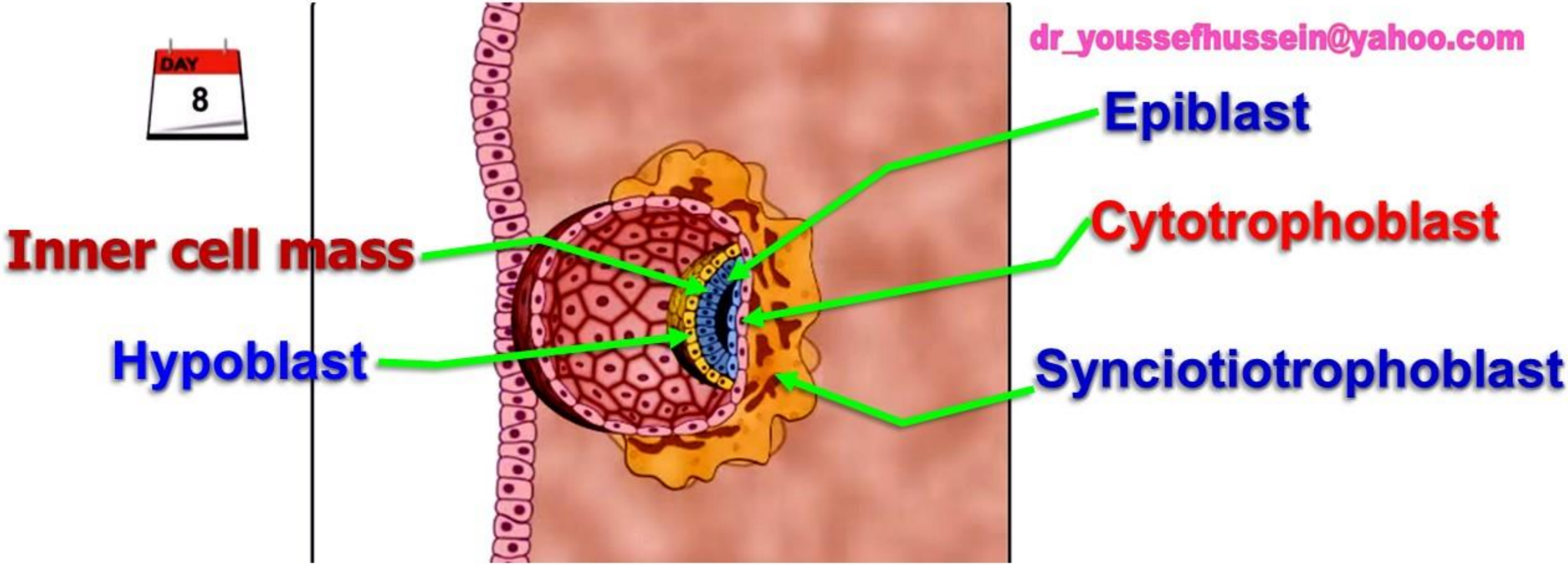


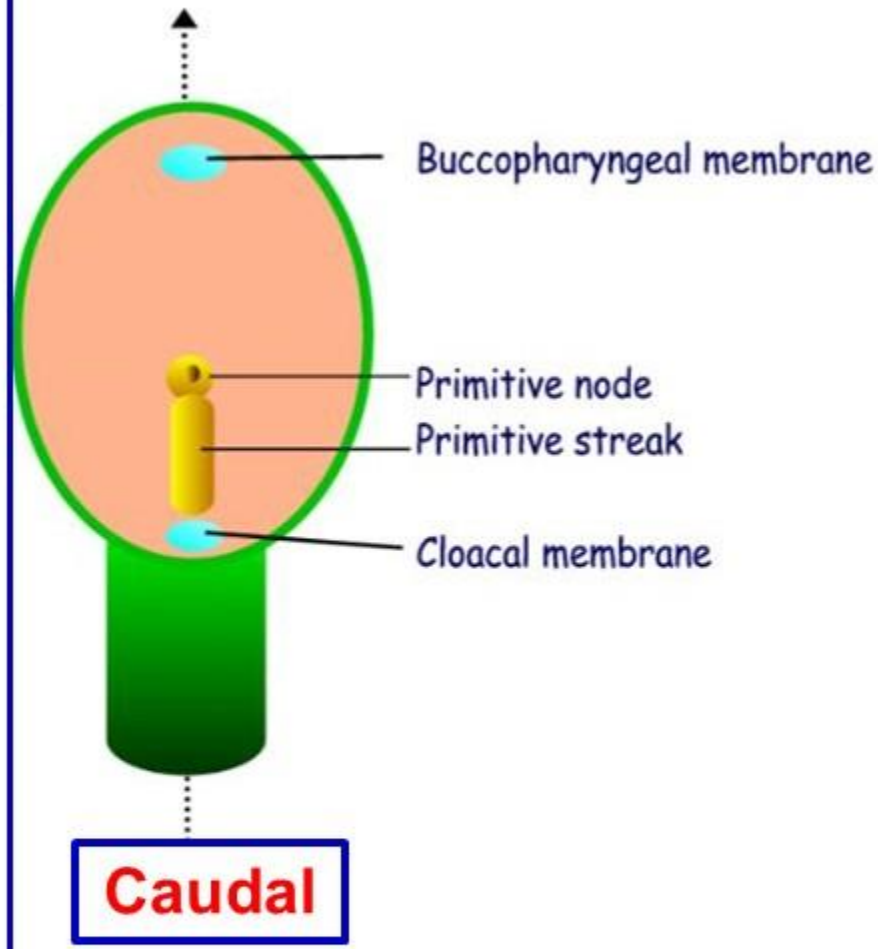
- The inner cell mass (**Embryoblast**) of the blastocyst proliferates and takes shape of flat circular disc.

- Their cells are differentiated into 2 layers **(Bilaminar germ disc) in the 2nd week:**

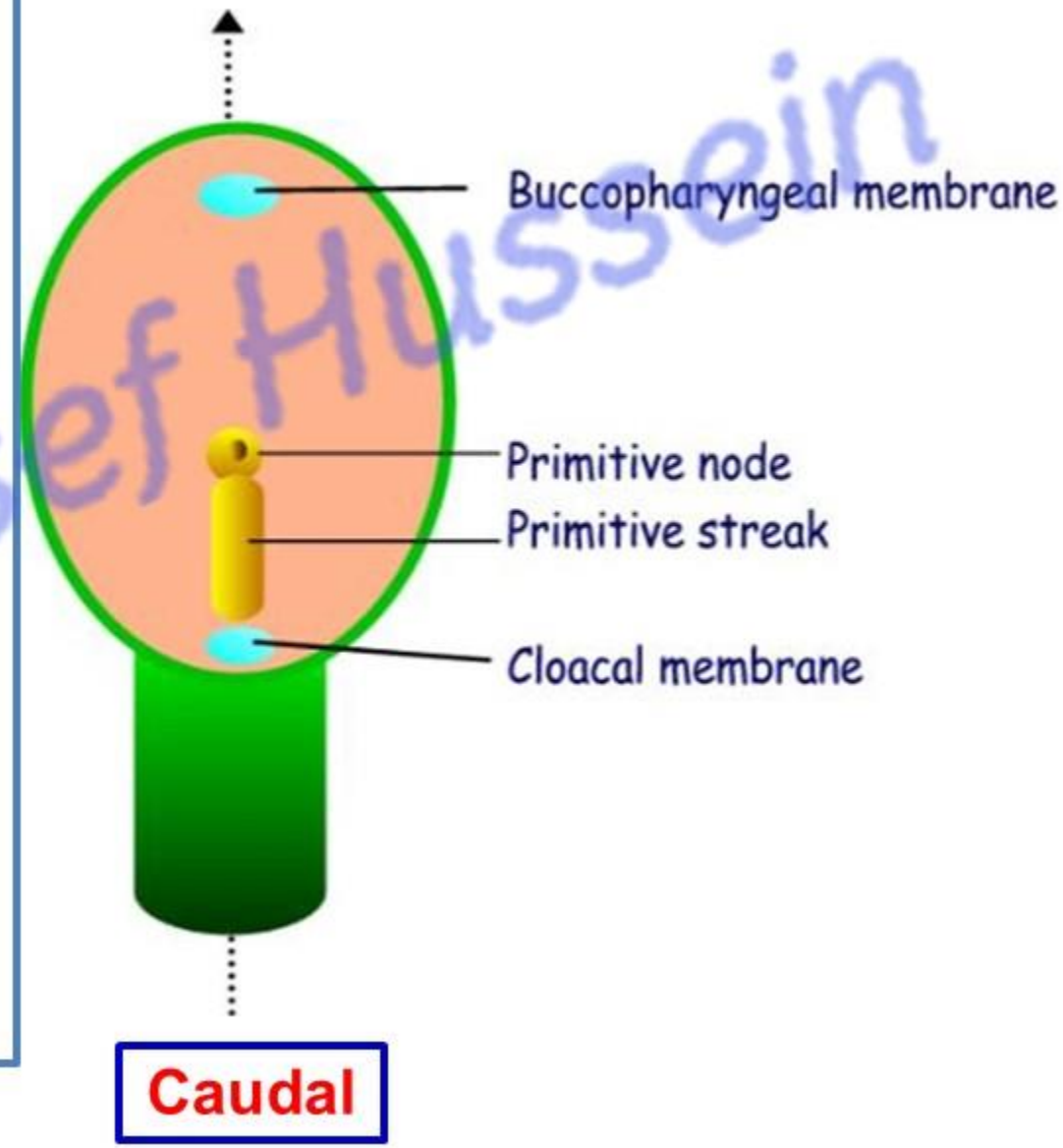
1. Dorsal columnar layer called **Epiblast close to the trophoblast.**

2. Ventral cuboidal layer called **Hypoblast close to the blastocele.**

- **The primitive streak** appears on day 15 of human development, is formed by the proliferation and migration of **epiblast cells** toward the posterior midline of the caudal half of the embryonic disc.
- Its cranial end enlarges to form **primitive node or Hansen's node**.
- **Functions of P. streak:** It is the rostral-caudal axis and initiating gastrulation.
- The epiblast is often considered the precursor to the ectoderm (sometimes termed **"primitive ectoderm"**).
- During gastrulation, the epiblast differentiates into all **three primary germ layers**—ectoderm, endoderm and mesoderm.



- **Prechordal plate (buccopharyngeal membrane)** a transient embryonic structure, is formed at the rostral end (**cranial**) of the embryo
- The **cloacal membrane** is a transient embryonic structure, is Located at the **caudal** end of the embryo,
- The primitive streak is a transient structure
- **Remnant of primitive streak** in the sacrococcygeal (tail end) region leading to **sacrococcygeal teratoma** (a rare tumor)
- **Treatment:** Surgical removal of the tumor and coccyx (tailbone).
- they can be life-threatening if they grow large, including fetal heart failure, preterm labor,



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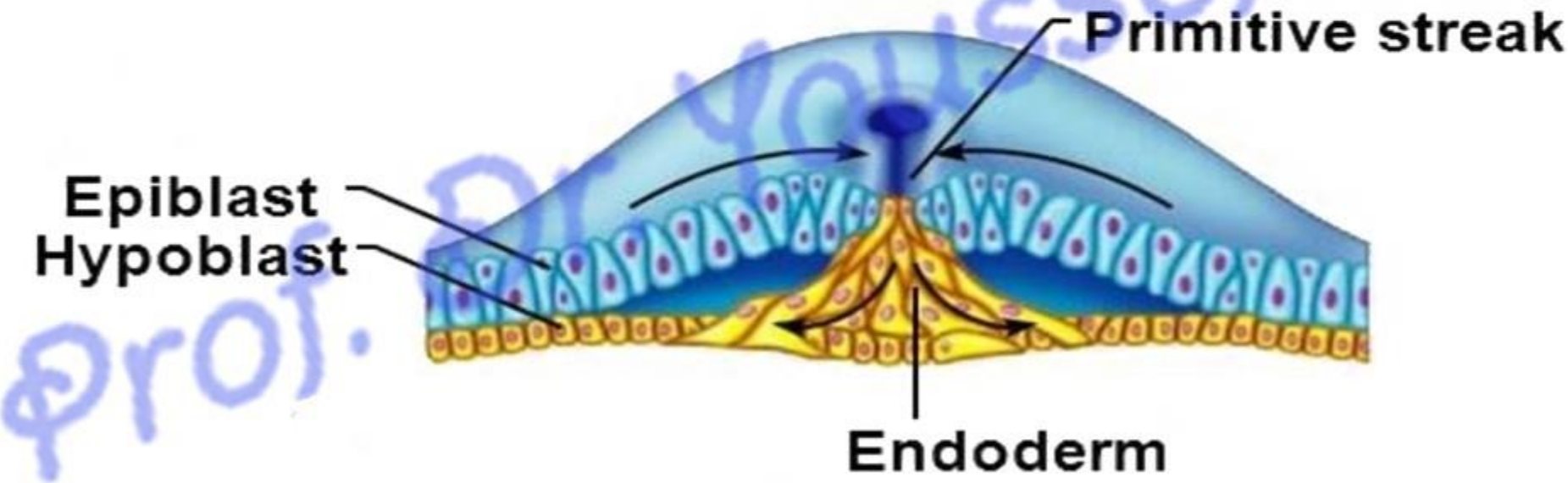
▪ Trilaminar germ disc

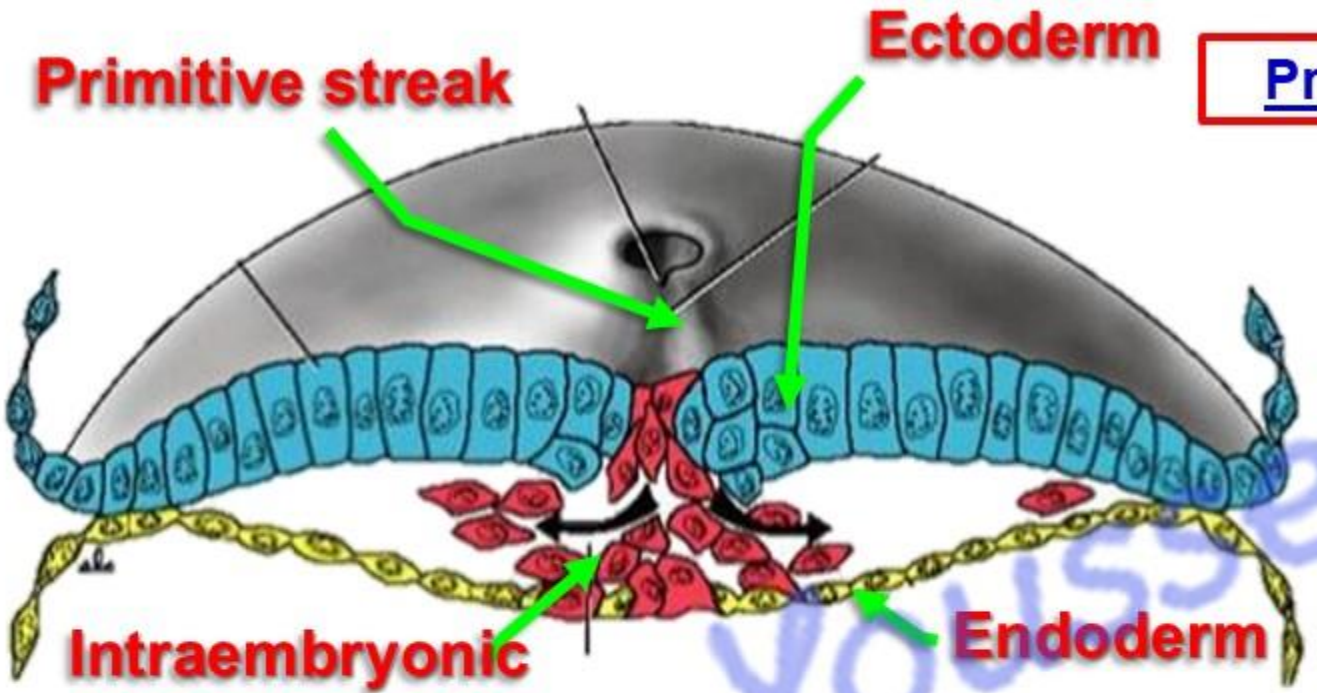
➢ Gastrulation

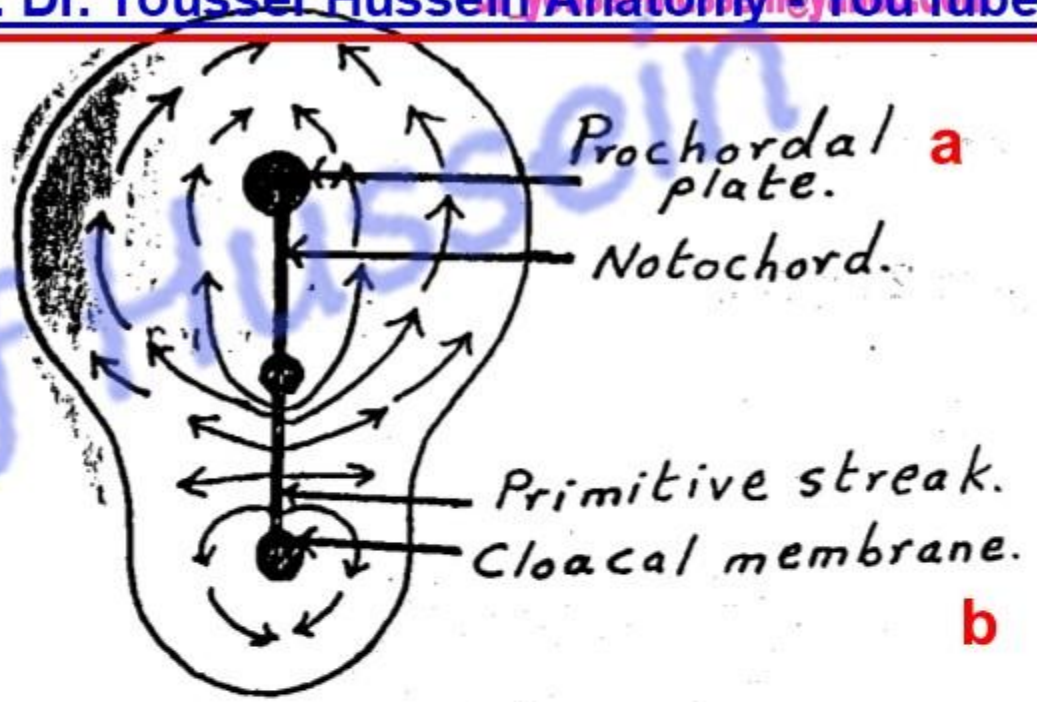
- The bilaminar disc is converted into a trilaminar disc called **Gastrulation**

- **Gastrulation (Trilaminar germ disc)**

- **The first step:** The epiblast cells forms the definitive **ectoderm**
- **The second step:** some of epiblast cells detach and migrate through the **primitive streak** (a process called ingression) to replace the underlying hypoblast layer. These migrating cells form the definitive **endoderm**







- **The third step: Day 17,** The cells of the **primitive streak** that originated from epiblast, proliferate and migrate in all directions between **ectoderm and endoderm** forming **intra embryonic mesoderm (I.M.M.)**
- **By the end of 3rd week,** I.M.M. separate ectoderm from endoderm **except**:

  a- Prechordal plate (cranial). b- Cloacal membrane (caudal).
- **They** remain bilaminar (ectoderm and endoderm) and **tightly fused**.

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Formation of Notochord

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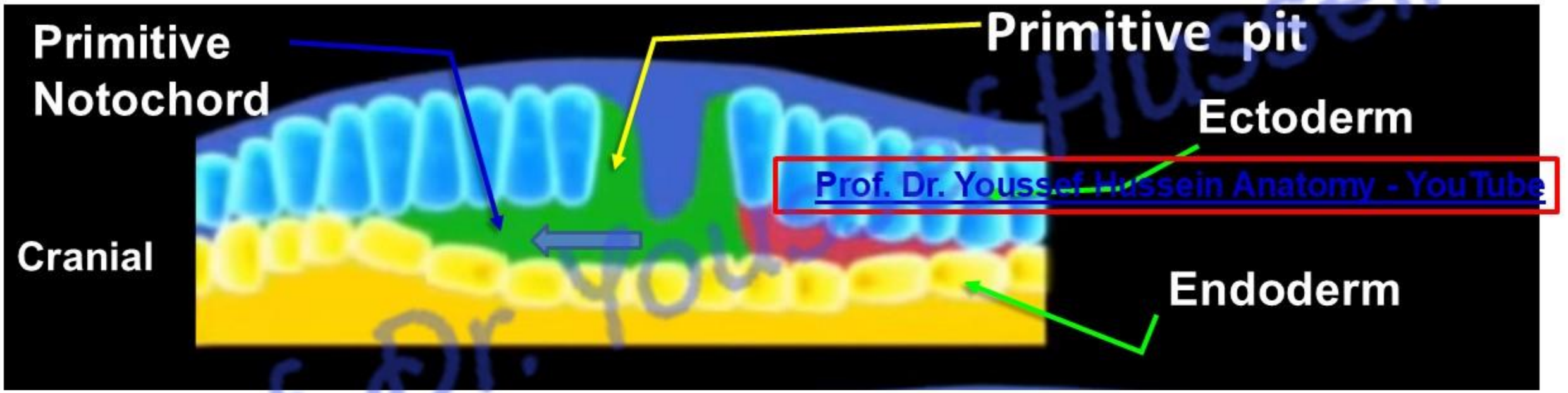
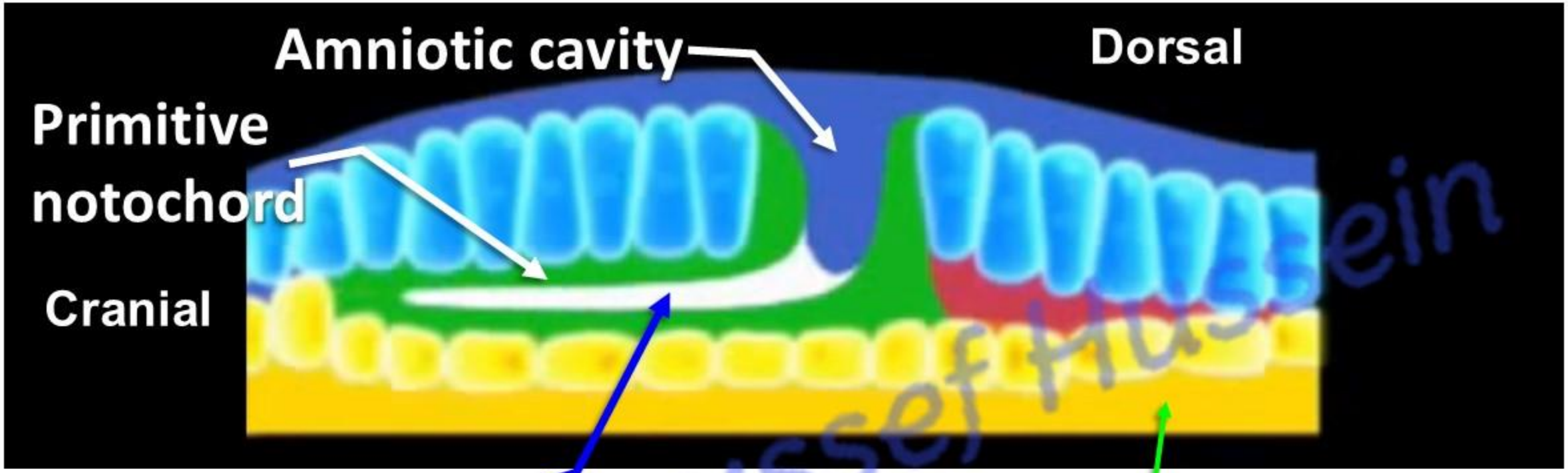
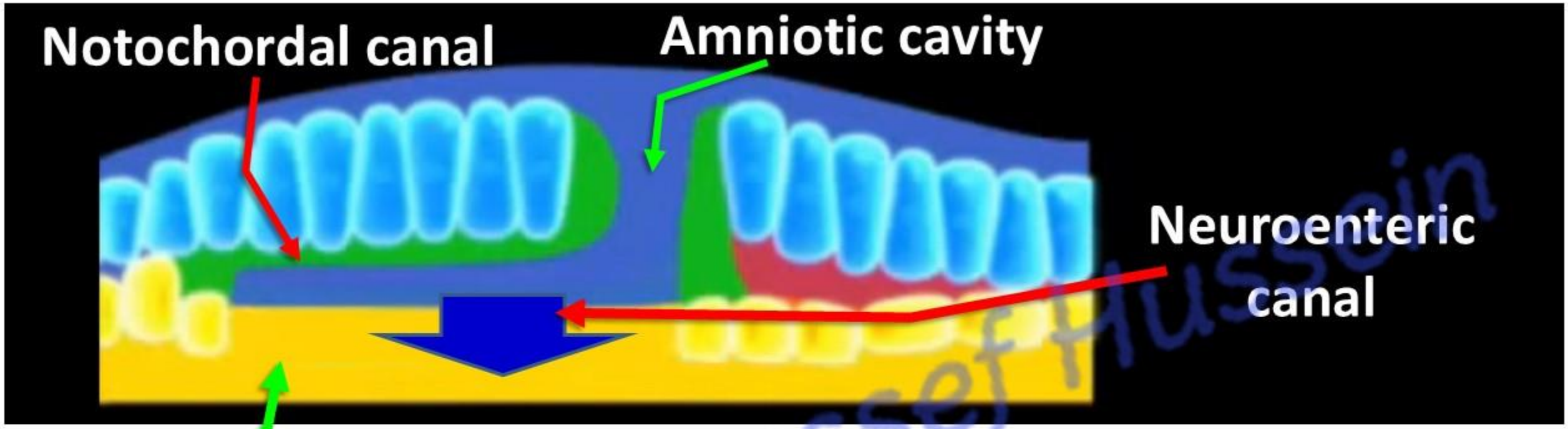


- During gastrulation (roughly day 17), Primitive pit in the primitive node
- Epiblast cells proliferate and migrate **cranially** in the midline **between** the ectoderm and endoderm to form **the primitive notochordal process,** extending until it reaches the prechordal plate.
- The notochord is developing from the mesoderm



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



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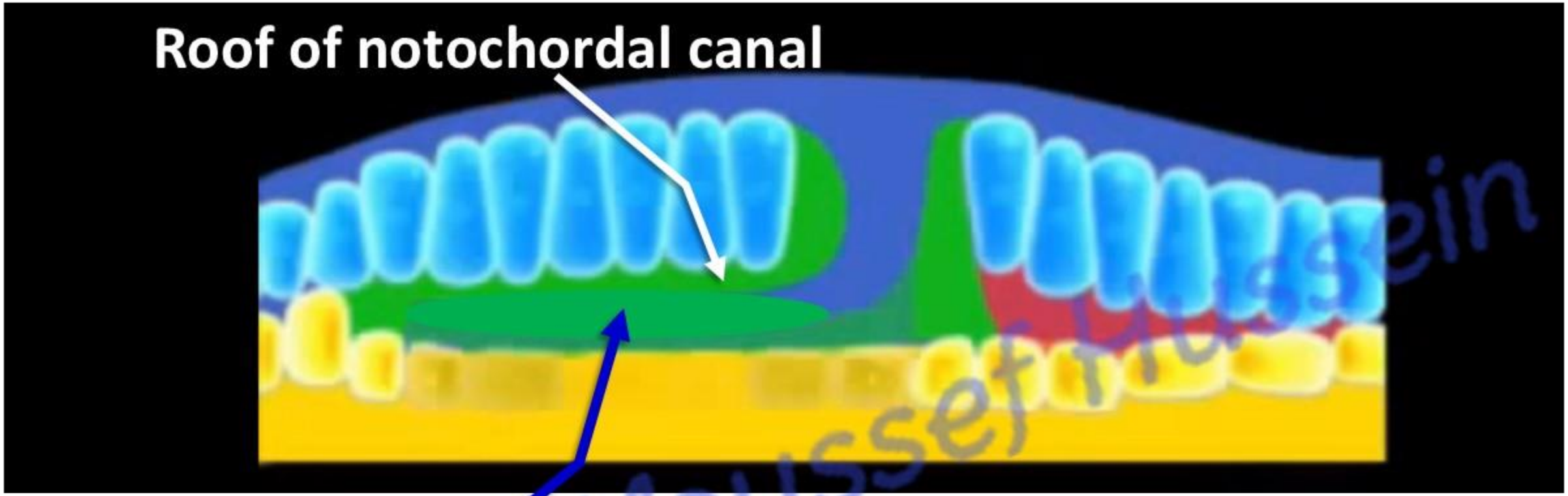
- **Degeneration** of the **floor of the notochordal canal** and **roof of the yolk sac leading to formation of neuroenteric canal**.
- As the result, a **temporarily communication** of the amniotic cavity (dorsal) and the yolk sac (ventral)
- The canal maintains and adjusts the pressure between amniotic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



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

- **Functions of notochord**

1. It forms **the primary axial skeleton of the embryo** before development of the vertebral column.
2. It secrets signals to stimulate development of **neural tube from ectoderm**.
3. It secrets signals to stimulate development of **somites** from **mesoderm**
4. It also plays a key role in the subsequent differentiation of somites into **sclerotome, myotome and dermatome.**
5. **It** forms the **nucleus pulposus** of the **intervertebral discs** between the bodies of vertebrae

https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd_cn0PQ

Thank you

Questions

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