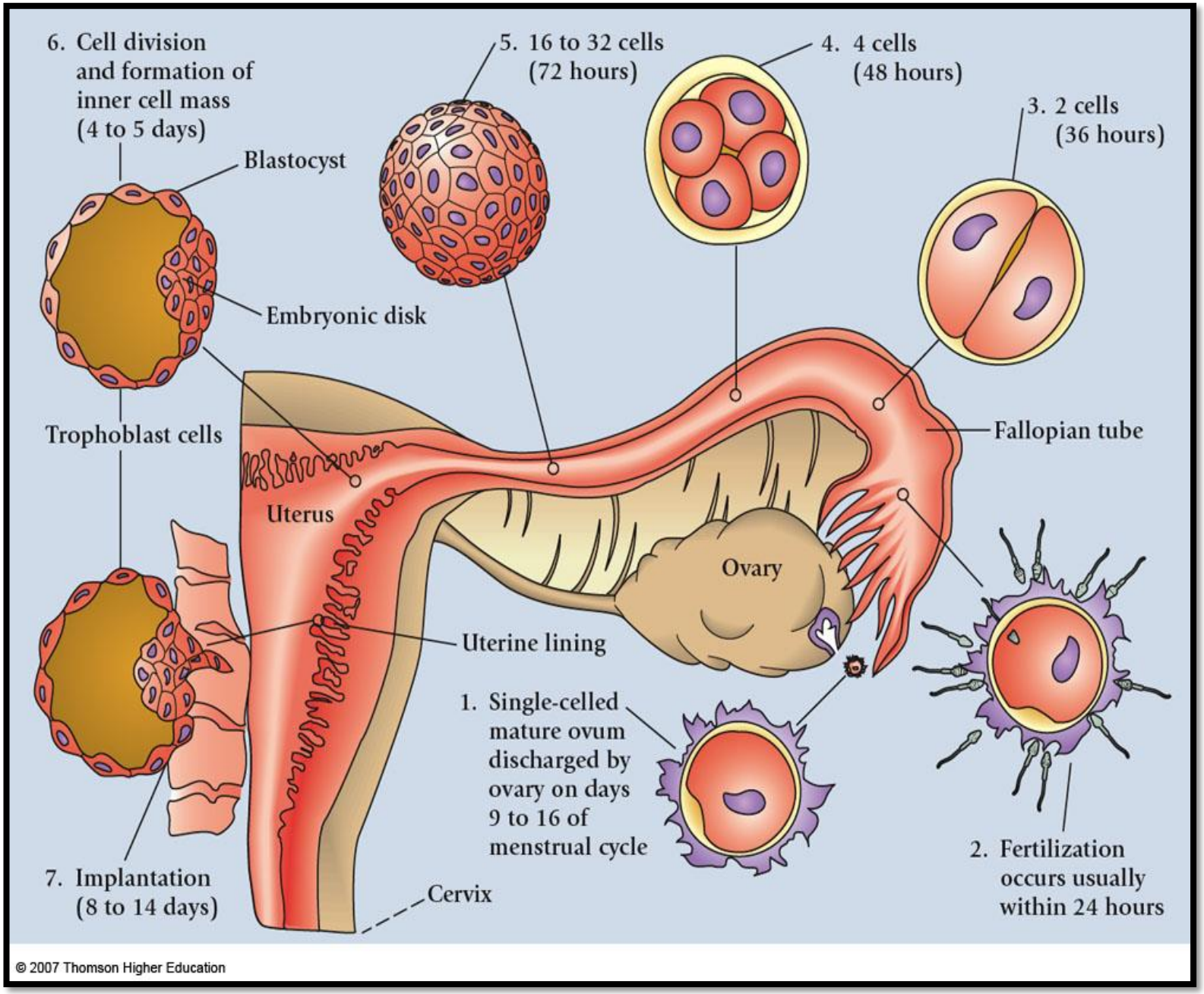

6. Cell division and formation of inner cell mass (4 to 5 days)
Blastocyst
Embryonic disk
Trophoblast cells
7. Implantation (8 to 14 days)
5. 16 to 32 cells (72 hours)
4. 4 cells (48 hours)
3. 2 cells (36 hours)
Fallopian tube
Uterus
Ovary
Uterine lining
1. Single-celled mature ovum discharged by ovary on days 9 to 16 of menstrual cycle
2. Fertilization occurs usually within 24 hours
Cervix
© 2007 Thomson Higher Education

The extraembryonic mesoderm lining the inside of the cytotrophoblast is then known as

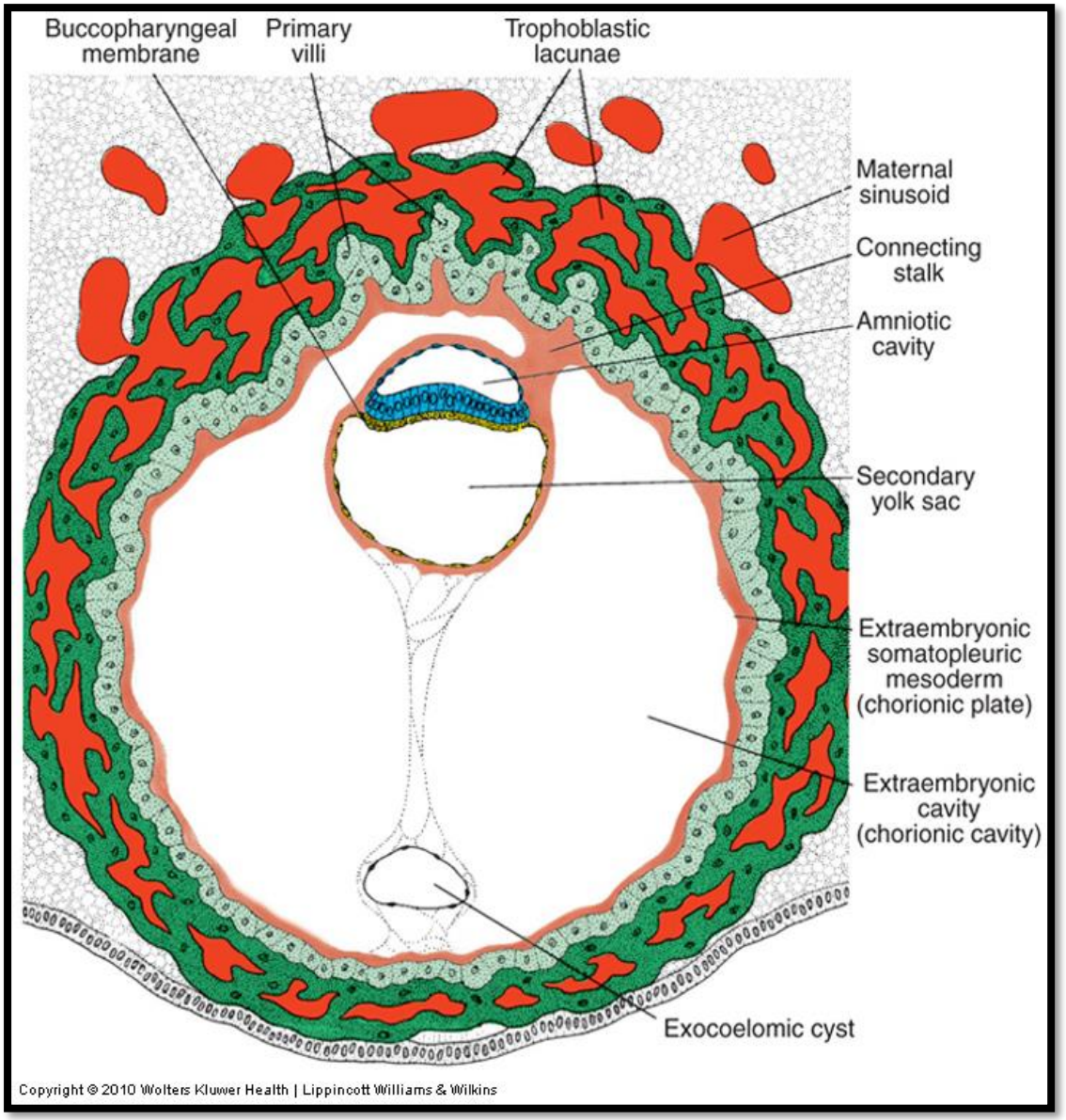
THE CHORIONIC PLATE

The only place where extraembryonic mesoderm traverses the chorionic cavity is in

THE CONNECTING STALK

With development of blood vessels, the stalk becomes

THE UMBILICAL CORD



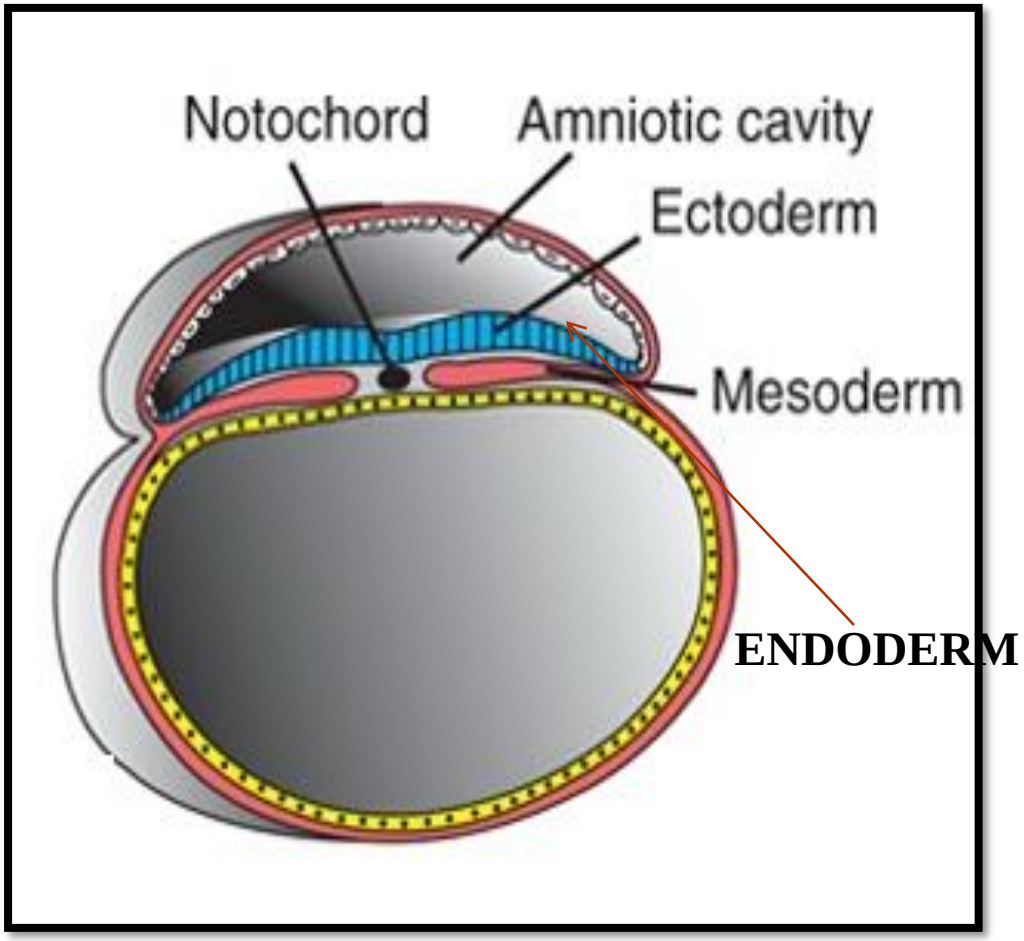
THIRD WEEK OF DEVELOPMENT

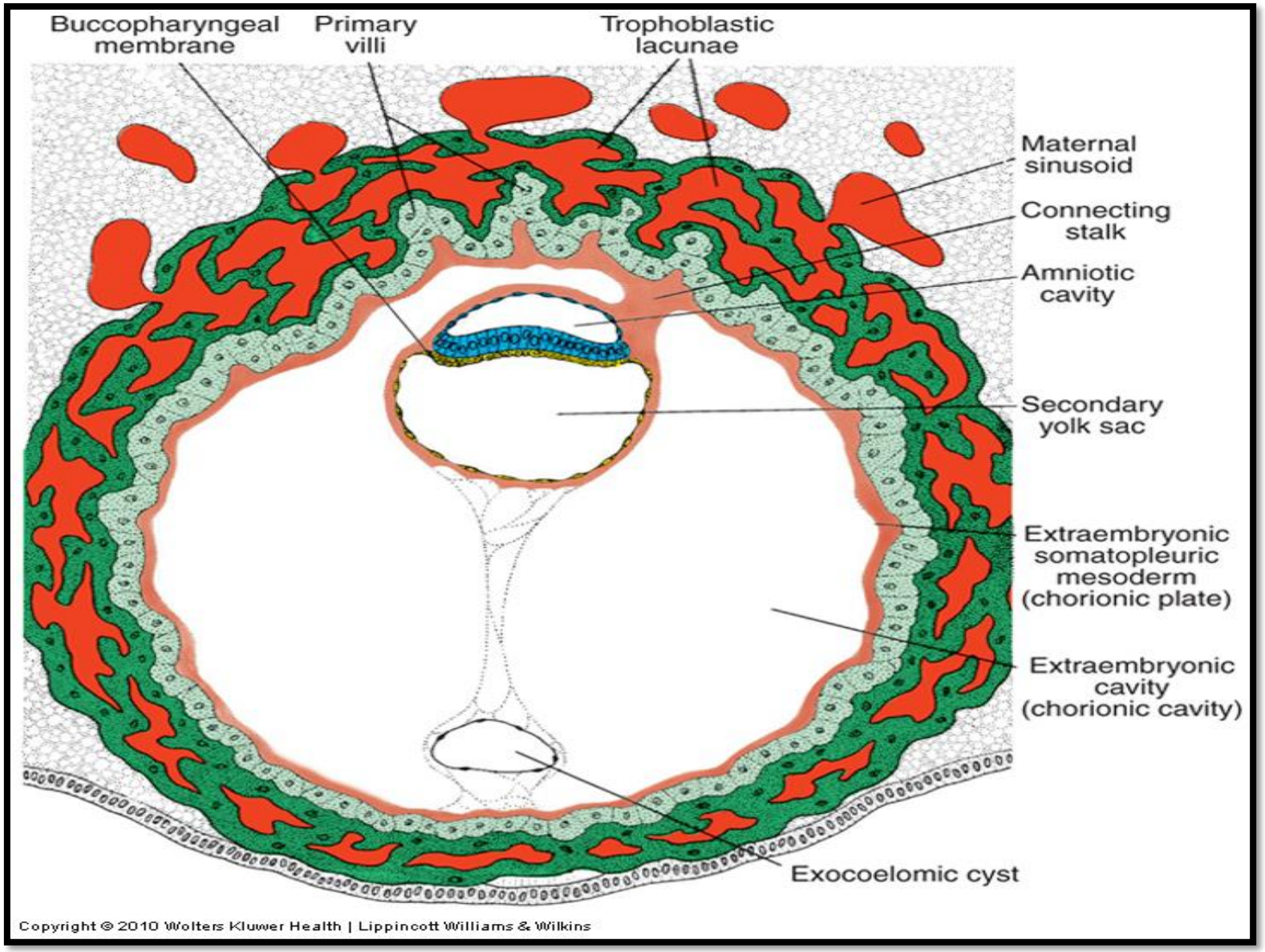
It is not birth, marriage or death,
but
gastrulation,
which is truly the most important time in your life

Lewis Wolpert (1986)

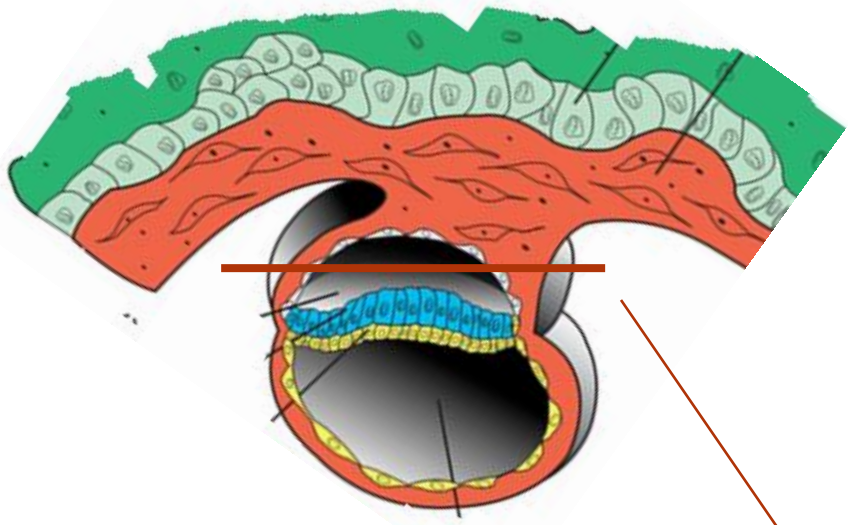
The most characteristic event occurring during the **third week** of gestation is **GASTRULATION**, the process that establishes all three germ layers in the embryo

1-ECTODERM
2-MESODERM
3-ENDODERM

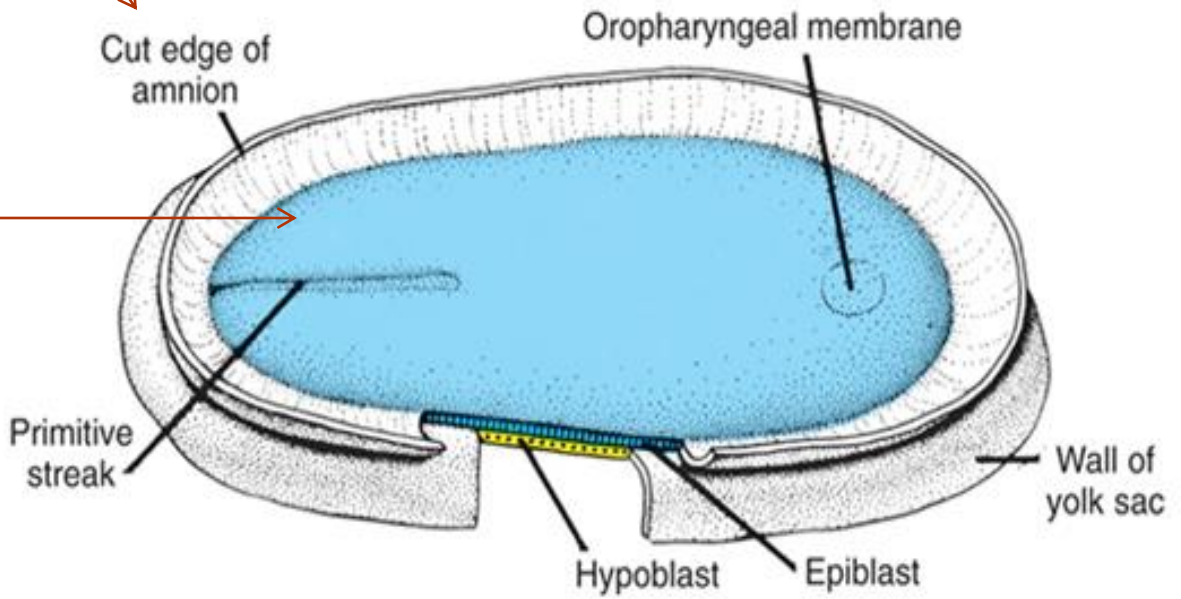




Copyright © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins



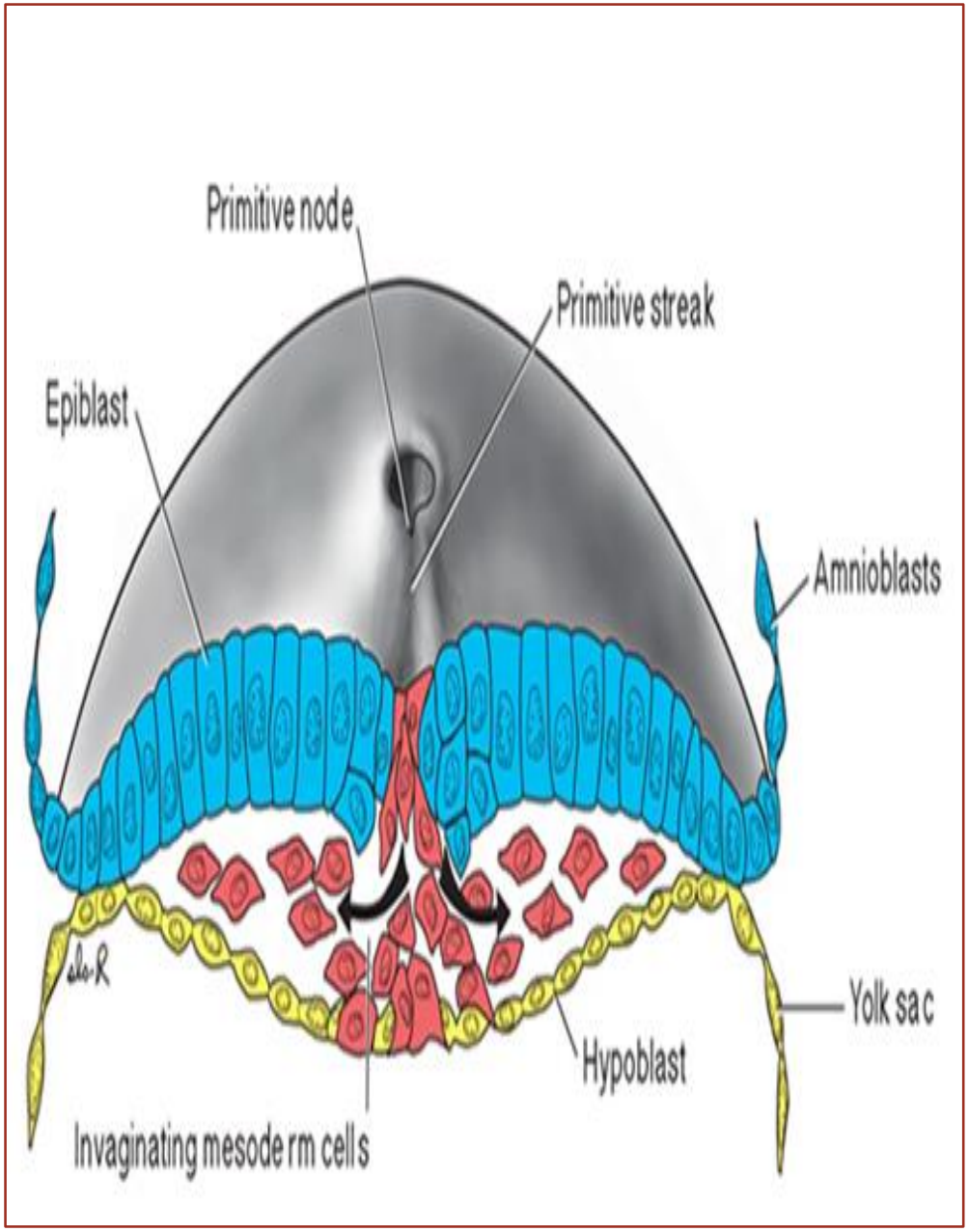
When viewed from above, through the amniotic cavity, the epiblast appears as an oval disc



The cells of the **EPIBLAST** are capable of **proliferation and migration**

These two features of the epiblast will lead to:

➢The cells of the epiblast start to proliferate forming **a swilling called PRIMITIVE NODE**



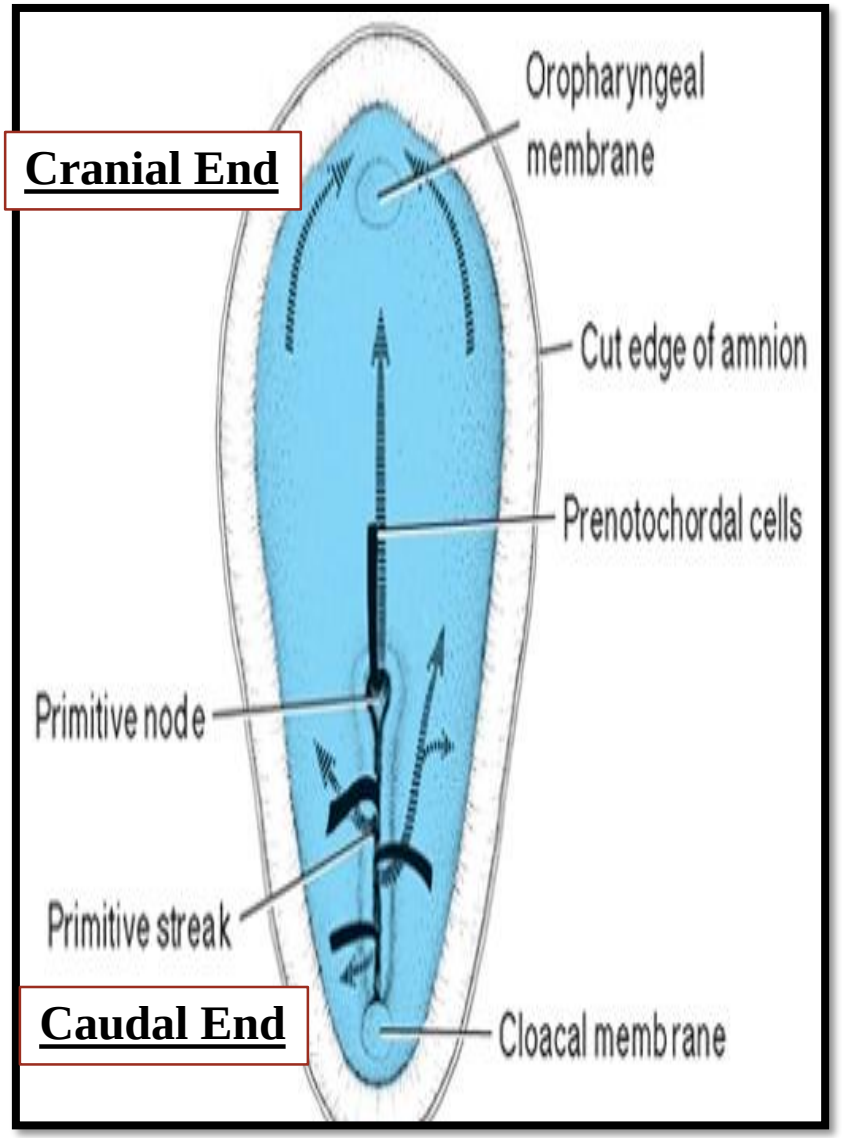
➢As the primitive node elongates

➢**THE PRIMITIVE STREAK**

appears

As
soon as the primitive streak appears,
it is possible to
identify the embryo's

1-Craniocaudal axis
(Cranial & Caudal Ends)
2- Dorsal & Ventral Surfaces
3- Right & Left Sides



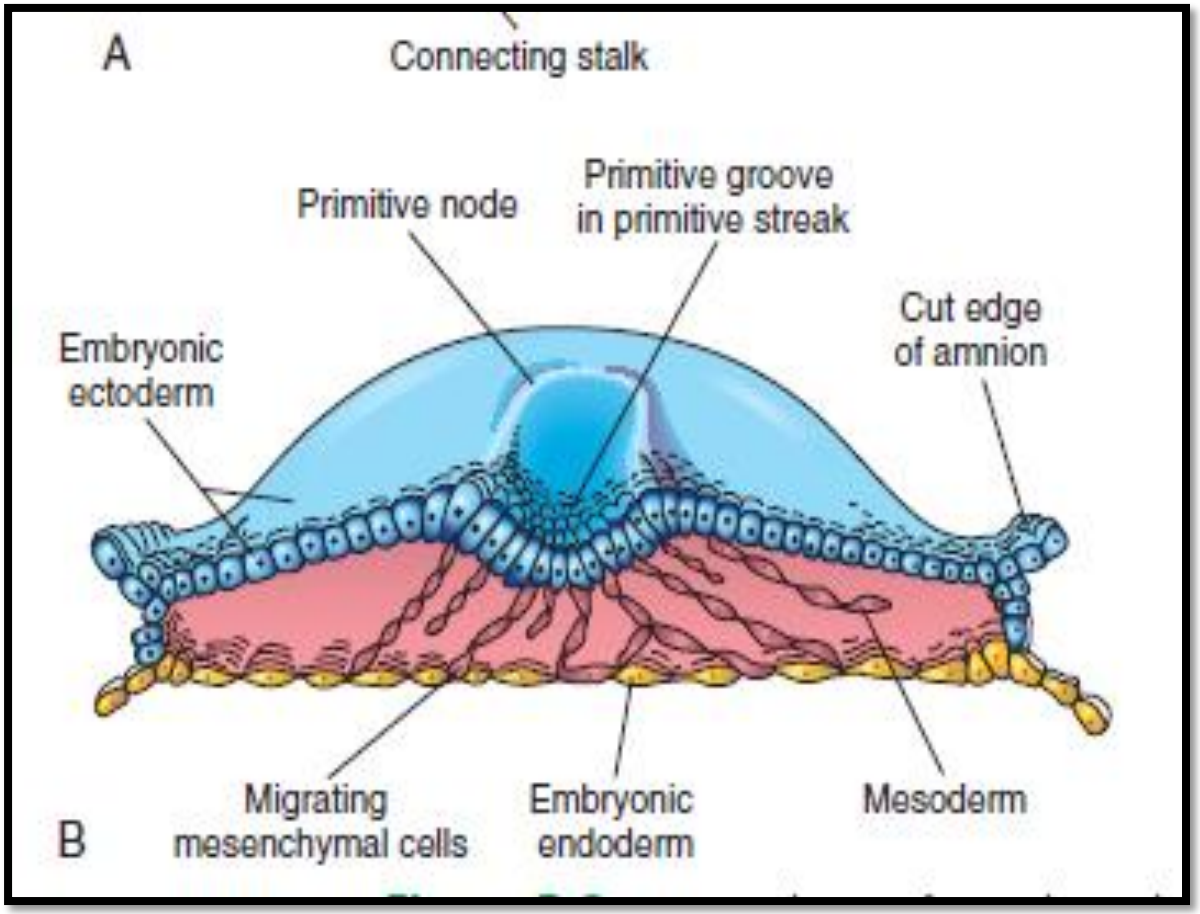
➢Cells of the epiblast

migrate toward the primitive streak .

➢The cells of the primitive streak **ingress** in the epiblast making **a pore** in the middle

➢Upon arrival in the region of the streak, they **detach** from the epiblast, and **slip beneath it**.

➢This **inward movement** is known as invagination.



➢**Once the cells have invaginated, some *displace* the hypoblast, creating the embryonic**

ENDODERM

➢Other cells come to lie between the epiblast and newly created endoderm to form

MESODERM

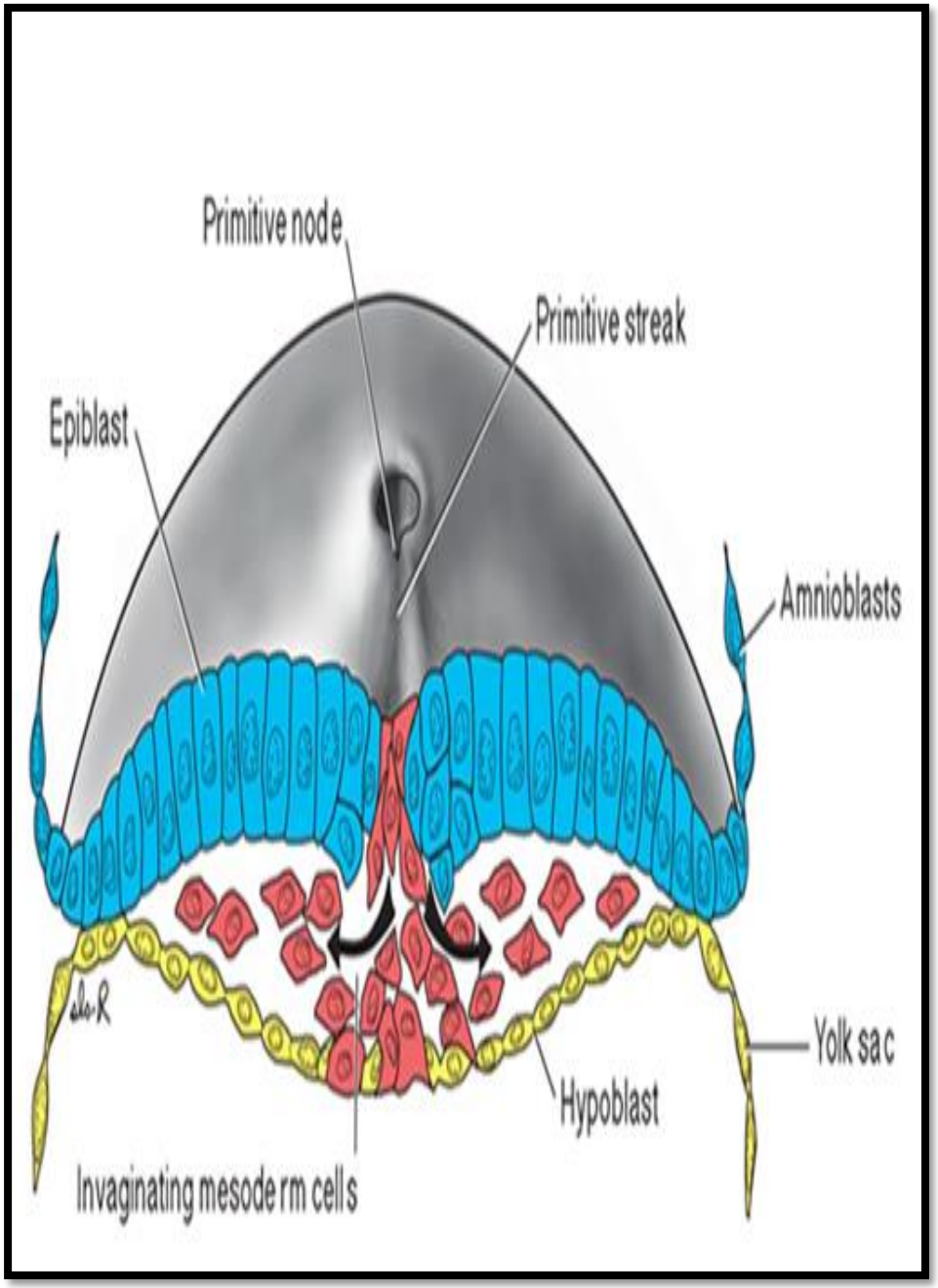
➢Cells remaining in the epiblast then form

ECTODERM.

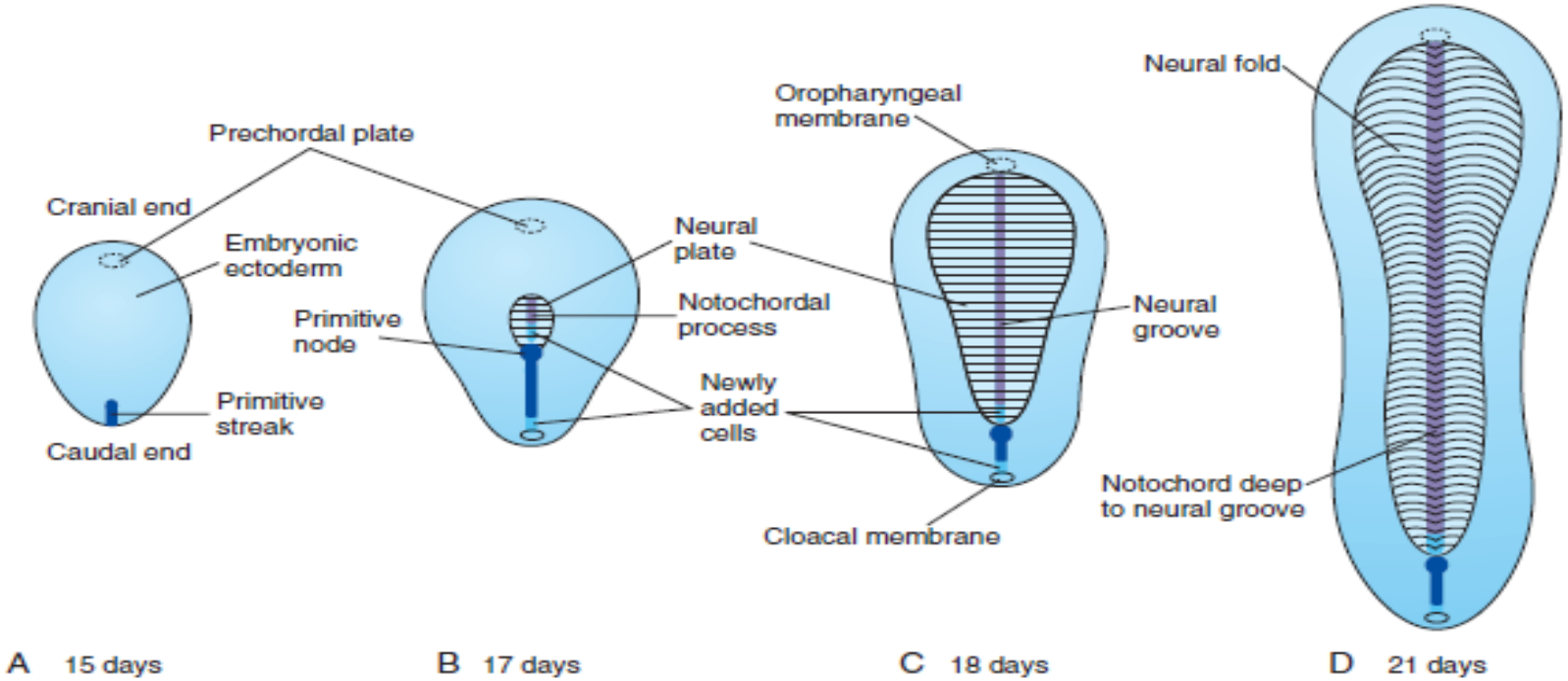
Thus, THE EPIBLAST, through the process of gastrulation,

is the source of all of the germ layers.

cells in these layers will give rise to all of the *tissues and organs in the embryo*.



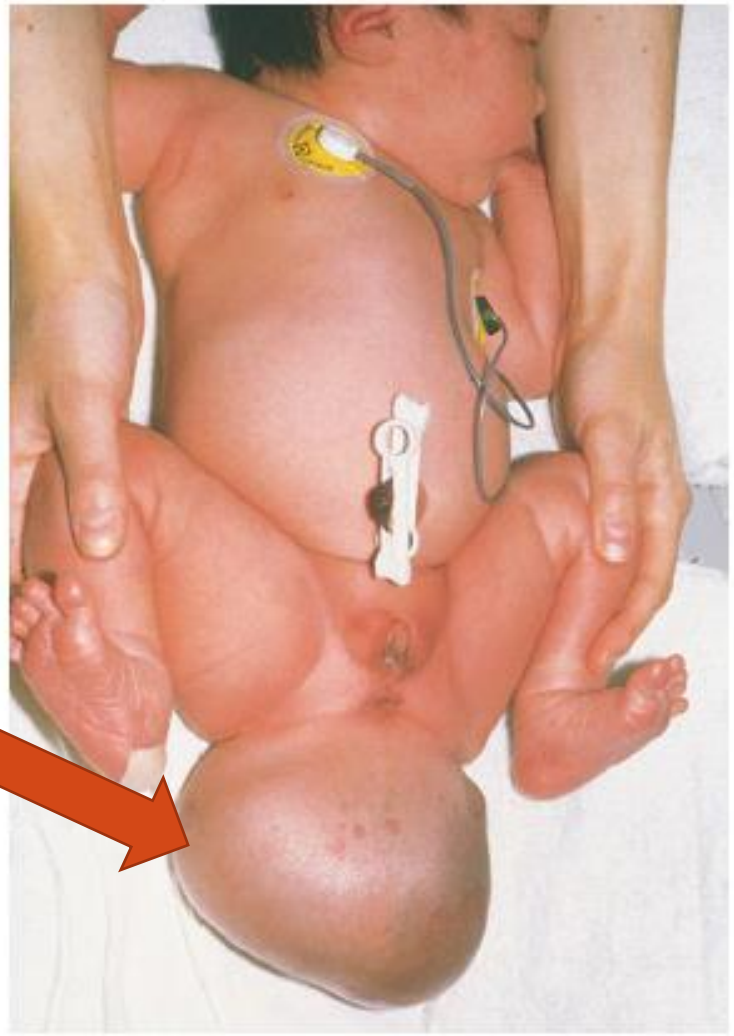
The ***primitive streak actively forms mesoderm until*** the early part of the fourth week; thereafter, its production slows down. The streak diminishes in relative size and becomes an insignificant structure in the sacrococcygeal region of the embryo



A to D, Dorsal views of the embryonic disc, showing how it lengthens and changes shape during the third week. The primitive streak lengthens by the addition of cells at its caudal end; the notochordal process lengthens by the migration of cells from the primitive node. At the end of the third week, the notochordal process is transformed into the notochord.

SACROCOCCYGEAL TERATOMA

Remnants of the primitive streak may persist and give rise to a large tumor known as a sacrococcygeal teratoma (Fig. 5-12). Because it is derived from pluripotent primitive streak cells, the tumor contains tissues derived from all three germ layers in incomplete stages of differentiation. Sacrococcygeal teratomas are the most common tumors in newborn infants and have an incidence of approximately 1 in 27,000 neonates. These tumors are usually surgically excised promptly, and the prognosis is good.

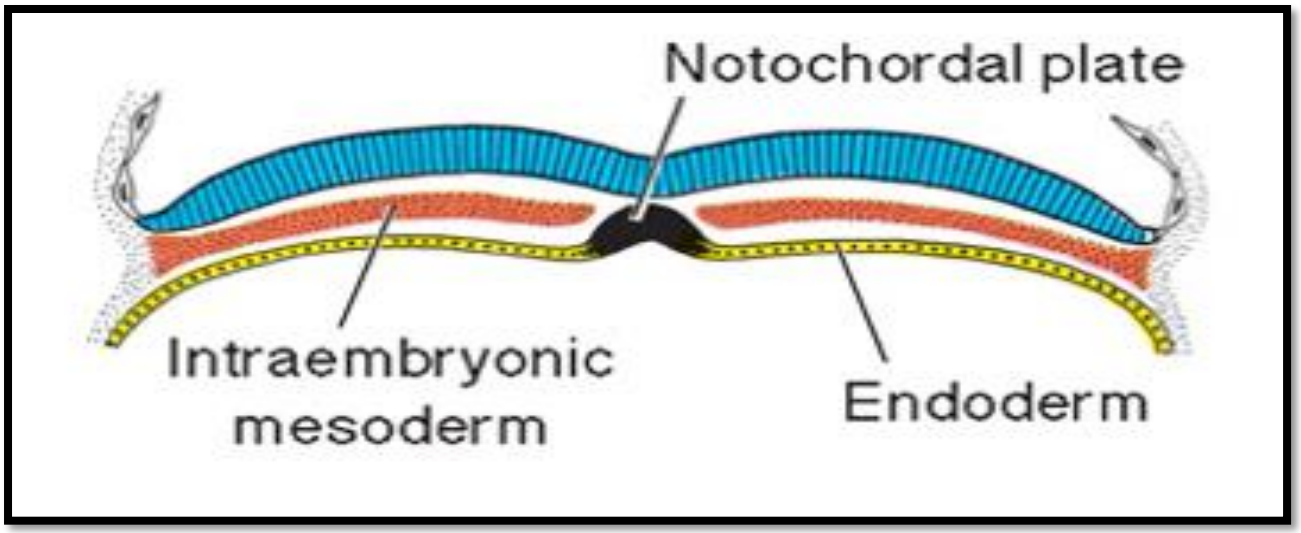


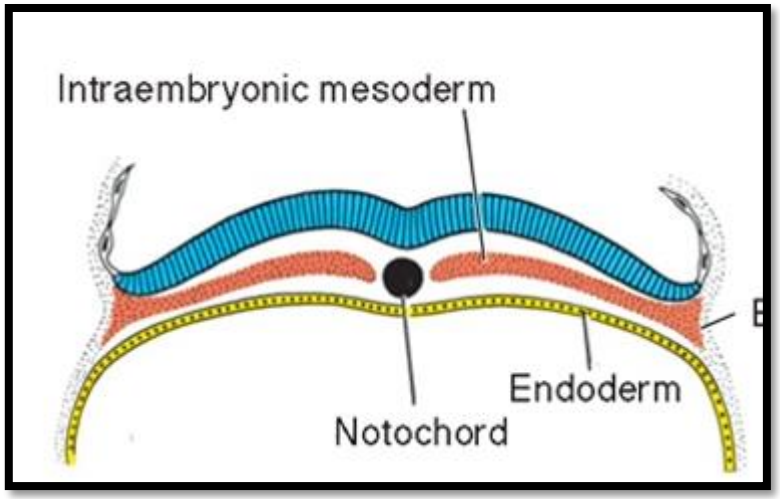
A female infant with a large sacrococcygeal teratoma that developed from remnants of the primitive streak.

A swelling appears on the upper surface of the hypoblast called

N O T O C H O R D

Because of the presence of the notochord in the middle of the trilaminar disc , the migrating cells from the epiblast will fill only the paraxial region (the area around the axis)



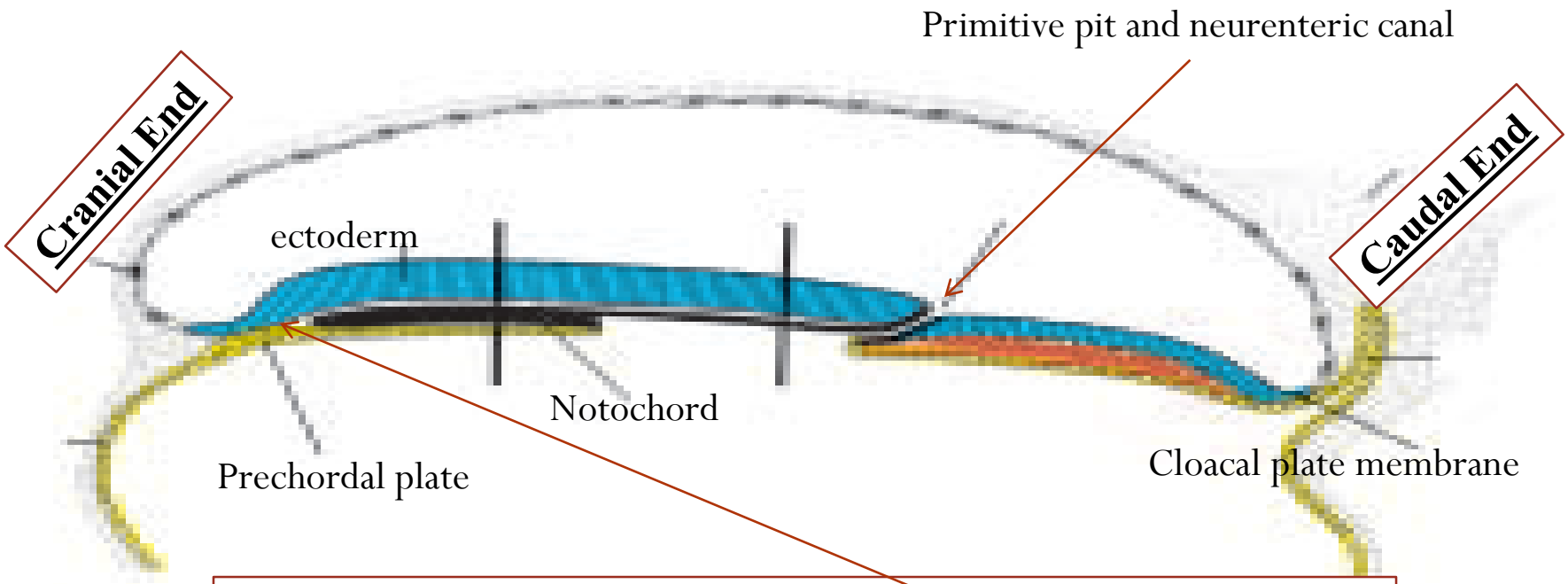


The notochord

grows cranially between

the ectoderm and endoderm

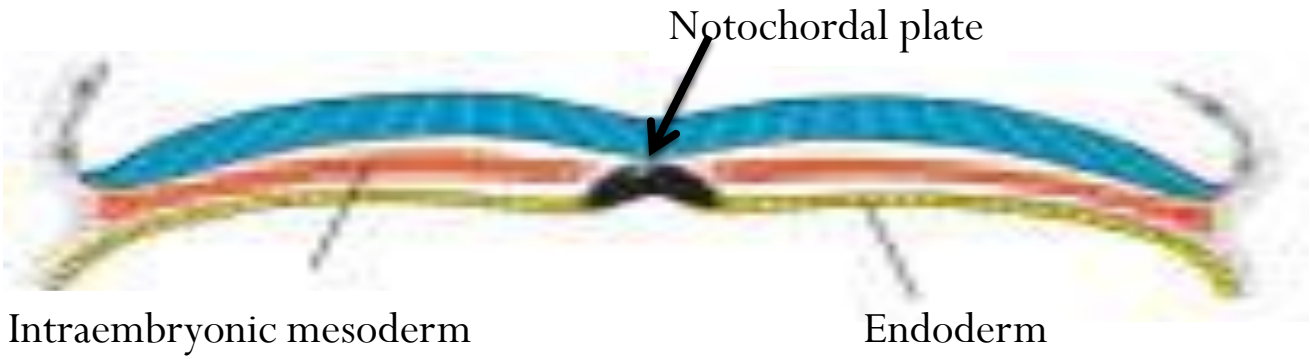
until it reaches the **prechordal plate**



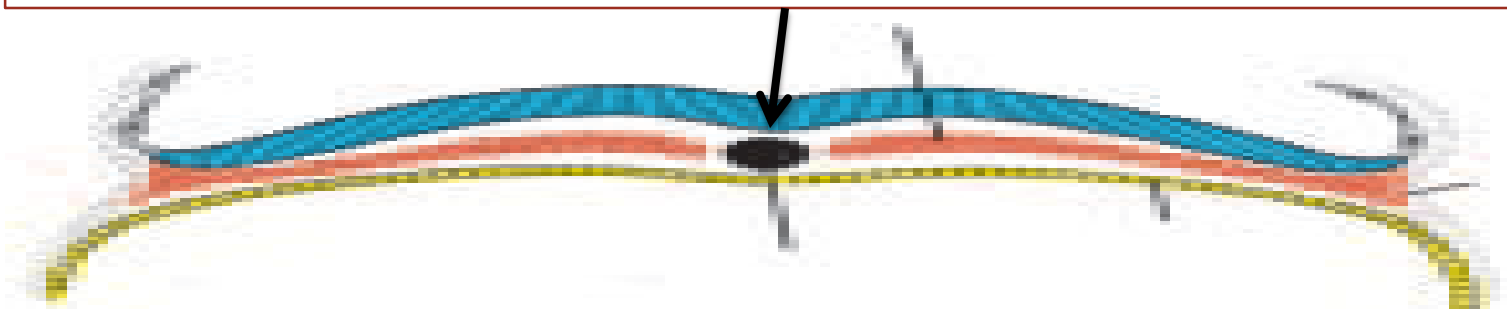
The notochord
can extend no farther because the prechordal plate is firmly attached to the overlying ectoderm.

Formation of the Notochord

1-Prenotochordal cells invaginating in the primitive pit
And
become intercalated in the hypoblast to form the
notochordal plate



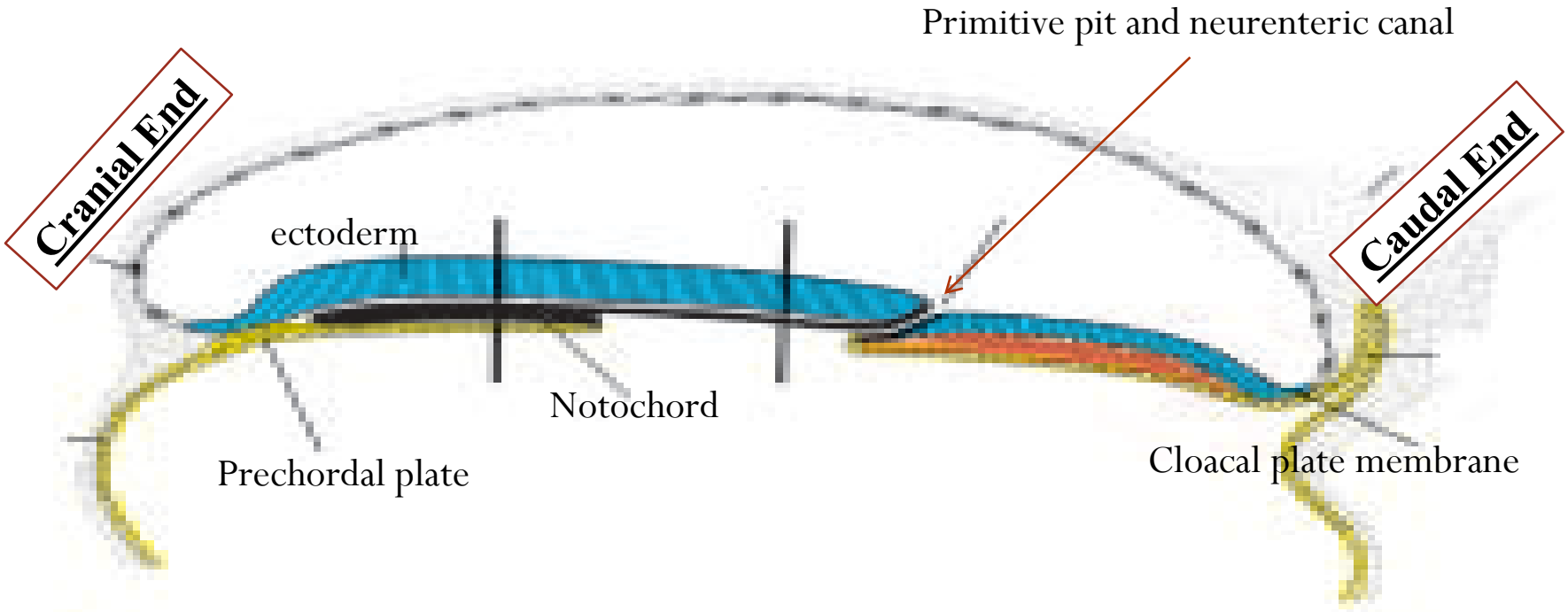
2-cells of the notochordal **plate proliferate** and **detach** from the endoderm. They then form a solid cord of cells,
the **definitive notochord**



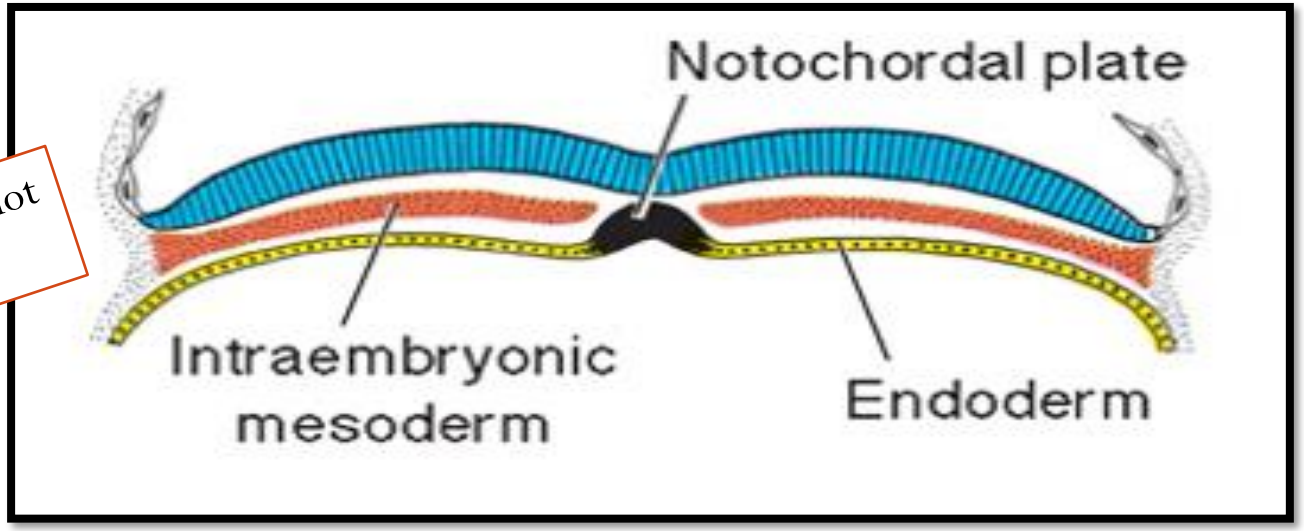
➢The cranial end of the notochord forms first and caudal regions are added later.

➢The notochord extend cranially to the prechordal plate and caudally to the primitive pit.

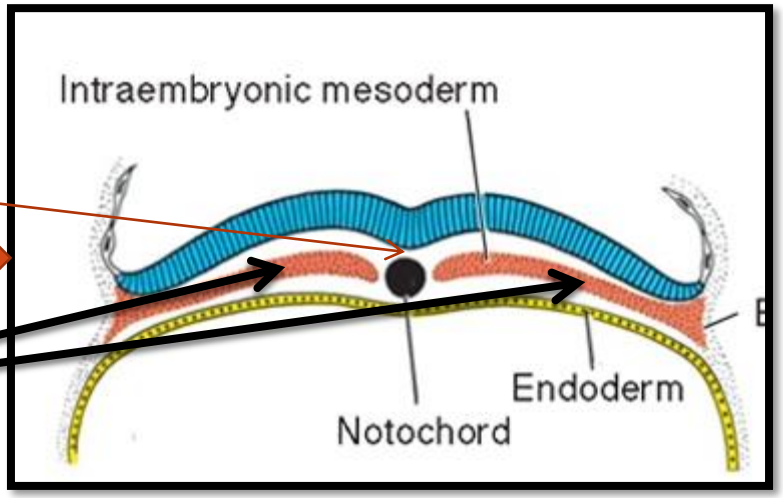
At the point where the pit forms an indentation in the epiblast, the **neurenteric canal temporarily connects the amniotic and yolk sac cavities**



The Mesodermal layer is not continuous



Because of the presence of the notochord in the middle of the trilaminar disc , the migrating cells from the epiblast will fill only the paraxial region (the area around the axis)

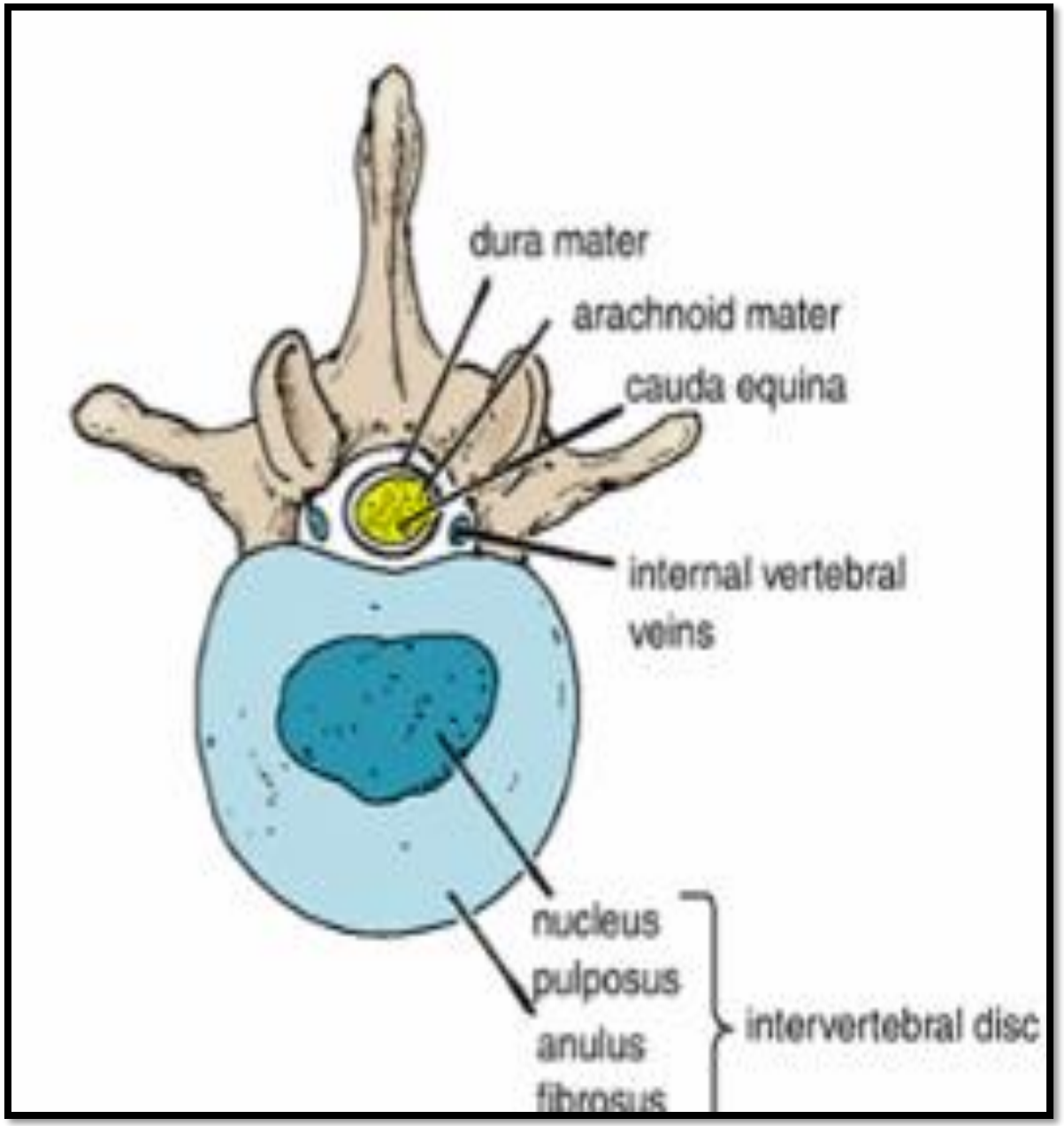


Functions of the notochord

- Defines the axis of the embryo and gives it some rigidity
- Serves as the basis for the development of the axial skeleton (such as the bones of the head and vertebral column)
- Indicates the future site of the vertebral bodies

The notochord

gives rise to the

Nucleus pulpous

Of the intervertebral disk