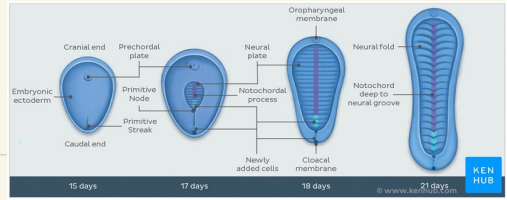


# Third week of development & gastrulation

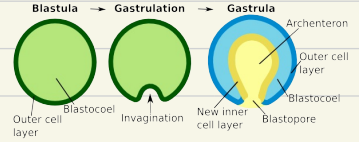


Following changes occur during 3rd week of pregnancy:

## Changes in embryonic disc

A) changes in the shape : the embryonic disc becomes pear shape because cranial part grows at a higher rate of caudal part

B) Gastrulation (15-20 day) it includes the following :



- 1) Formation of Primitive streak (15 days)
  - 2) invagination
  - 3) Formation & beginning of differentiation of intra-embryonic mesoderm
- C) Formation of notochord
- d) neurulation (neural tube)
- e) beginning of folding of embryonic disc (end of 3rd week)

## Changes in trophoblast (chorion)

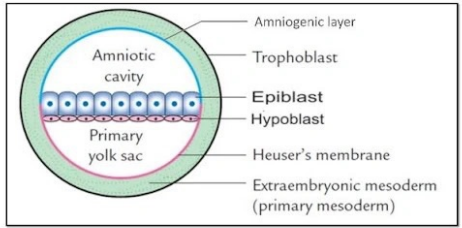
→ 3 types of chorionic villi (Primary, Secondary & tertiary) develop and cover whole surface of chorionic vesicle

## Development of trophoblast during 3rd week

Formation of choiron → outer wall of chorionic vesicle/sac formed of 3 layers

From external to internal

- \* syncytiotrophoblast
- \* cytotrophoblast
- \* Extraembryonic somatic mesoderm



Chorionic villi → chorion gives rise to finger like processes called chorionic villi

→ the spaces between chorionic villi are filled with maternal blood

↳ derived from eroded blood vessels

↳ those are called lacunae, which are the future intervillous spaces

## Types of chorionic villi

**Primary** → Cytotrophoblastic core and covered by a syncytiotrophoblast layer

→ Separated by lacunae filled with maternal blood

**Secondary**

→ During middle of 3rd week, extraembryonic mesoderm invades the core of primary villi

→ 2° villi is formed of a core of mesoderm covered by cytotrophoblast then syncytiotrophoblast

**Tertiary**

→ by end of 3rd week, mesodermal cells in core of 2° villi begin to differentiate into blood vessels

→ separated by inter villous spaces filled with maternal blood

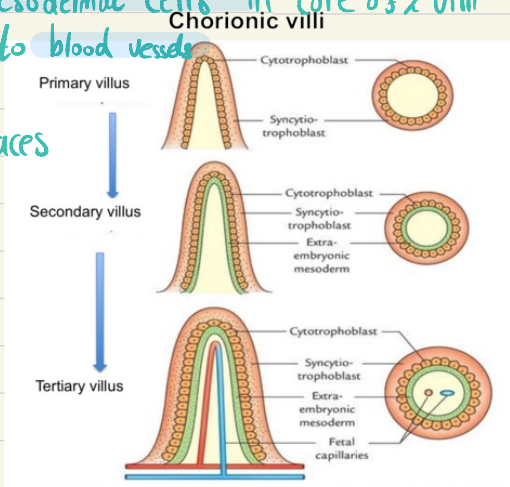
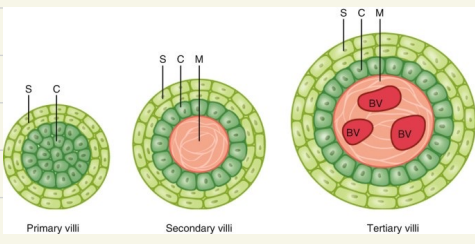
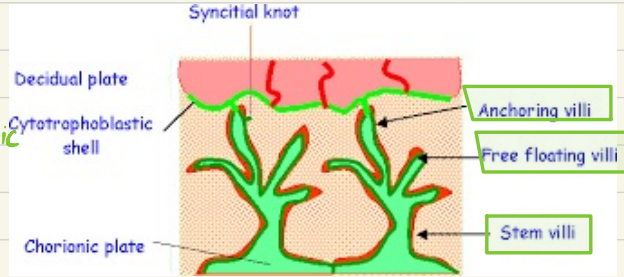


FIG. 6.11 Three stages of development of villi. Figures on the right side are the sectional views of three types of villi.

# Parts of tertiary villi

**Stem villi** → attached to chorionic plate



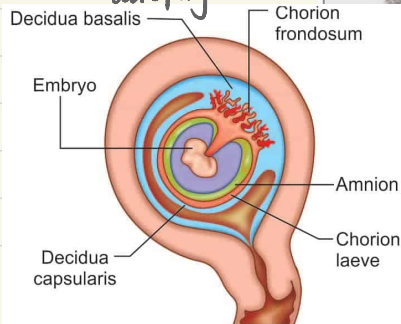
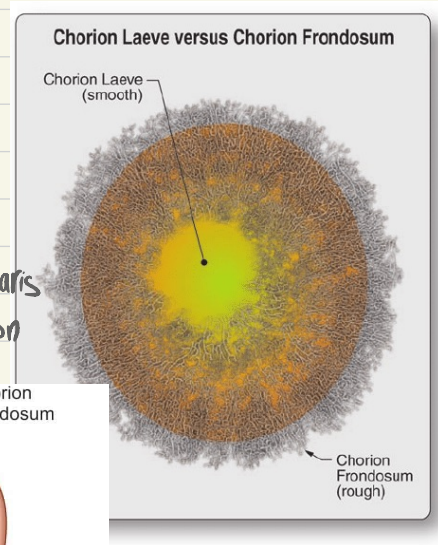
**Anchoring villi** → extend to decida basalis (endometrium forming maternal part of placenta) to fix chorionic vesicle to uterine wall

**Free, float, absorbing** → side branches from stem villi and float freely within maternal blood in intervillous spaces

at these villi exchange of nutrients & other factors will occur

**Chorion Frondosum** → Villi adjacent to decida basalis (of endometrium) enlarge which will form fetal part of placenta

**Chorion leave** → adjacent to decida capsularis (of endometrium) will chorion leave → atrophy

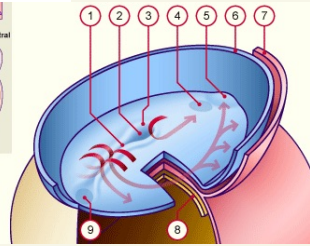
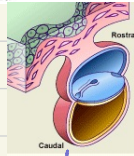
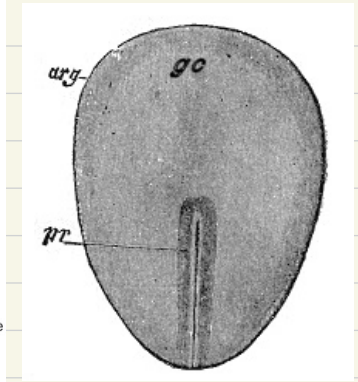
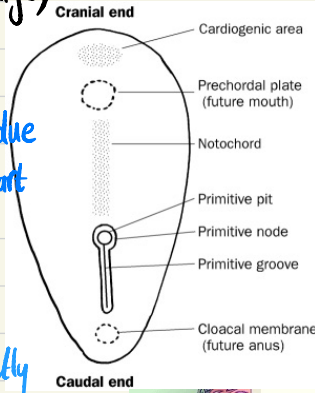


**Gastrulation** → Process of transformation of bilaminar embryonic disc to form a trilaminar germ disc

① Formation of Primitive streak (15 days)

Formed in the median region of embryonic disc near its caudal end due to migration of epiblast in caudal part to middle line

it appears as a narrow groove ((Primitive groove)) with slightly bulging region on both sides



(15)

its cephalic end forms a bulge → Primitive node

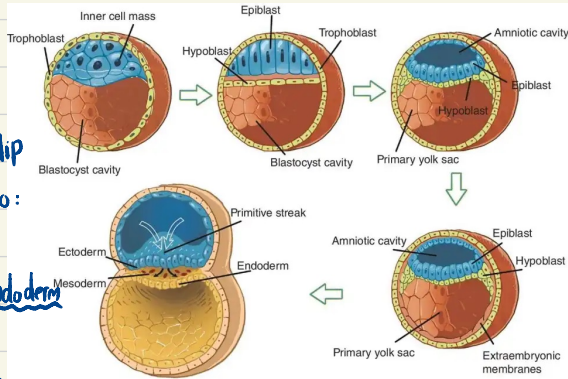
which has a central depression → Primitive pit

② **invagination** :

Cells migrate towards primitive streak, slip beneath it into interior embryonic disc to:

a) invade and replace the hypoblast to form endoderm

b) remaining part of epiblast → ectoderm

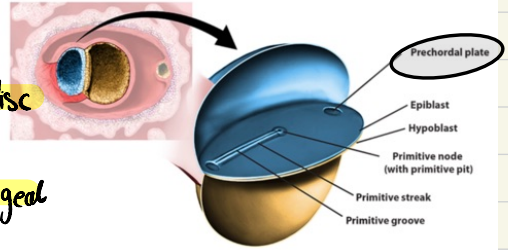


c) Some of invaginated epiblast cells remain and migrate in all directions in between ectoderm and endoderm to form → intra-embryonic mesoderm

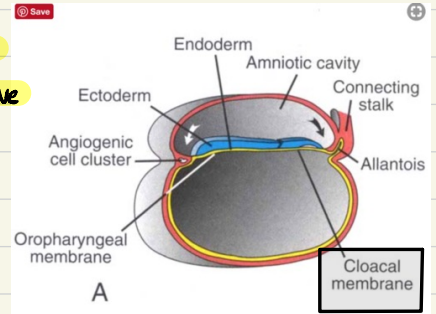


embryonic disc remains bilaminar → ectoderm and endoderm with no intervening mesoderm in 2 sites :

- 1) **Prochordal** : near cephalic end of embryonic disc  
The Prochordal plate later will share formation of oro-pharyngeal membrane



- 2) **Cloacal membrane** : immediately behind the caudal end of the primitive streak



### Formation of the notochord :

READ ONLY

- ❖ Formation of the **pre-notochordal process** by invagination of cells in the **primitive node**.
- ❖ These cells grow cranially in the median plane between endoderm & ectoderm until they reach the buccopharyngeal membrane.
- ❖ A fine canal develops, starts from the **primitive pit** then extends cranially into the pre notochordal process, transforming it to **pre notochordal canal**.
- ❖ **Notochordal-endodermal fusion**: The **floor** of pre notochordal canal is adherent to the underlying endoderm.
  - The floor of the pre notochordal tube **degenerates** together with the underlying endoderm, forming a **Neurenteric canal** that temporarily **connects** the yolk sac with the amniotic cavity.
  - **Notochordal plate** is formed by fusion of the **roof** of the pre notochordal canal with the surrounding endoderm.

سُبْحَانَ اللَّهِ وَبِحَمْدِهِ  
سُبْحَانَ اللَّهِ الْعَظِيمِ

Definitive notochord → Solid cord extending from primitive pit to prochordal plate  
Significance of notochord → Temporary axial skeleton for the embryo being replaced later on by vertebral column which is permanent axial skeleton