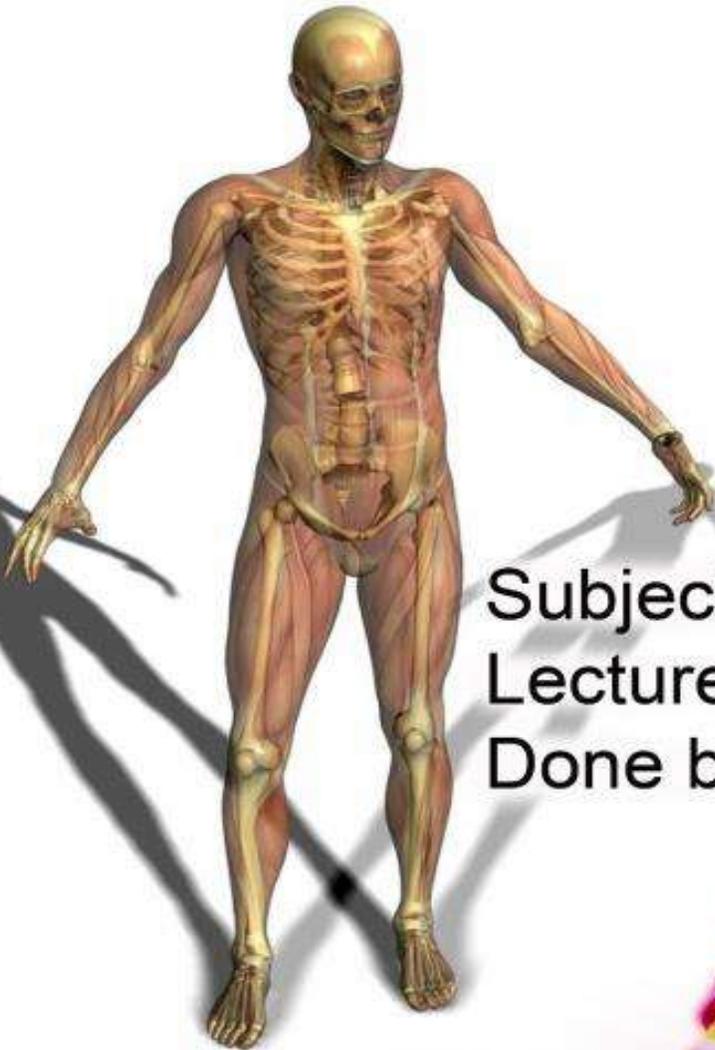




# ANATOMY

Sheet



Subject : *Embryology*

Lecturer : *Dr. Maher Hadidi*

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lecture # : 34

Date : April/25<sup>th</sup>/2013

# Third week embryo

Last time we talked about events during 2<sup>nd</sup> week of pregnancy.

- fertilization at day (14) of females period ,then 1<sup>st</sup> week (15 -20) , after that 2<sup>nd</sup> week (21-28) ,now the 3<sup>rd</sup> week will start.....

## Events during the 3<sup>rd</sup> week:

- The lady missed the first period, and beginning of embryonic stage “embryonic period” from 3<sup>rd</sup> -8<sup>th</sup> week, why? To form layers of the body (endoderm, ectoderm, and mesoderm) by process called “gastrulation”, and to form organs by process called “**organogenesis**”.

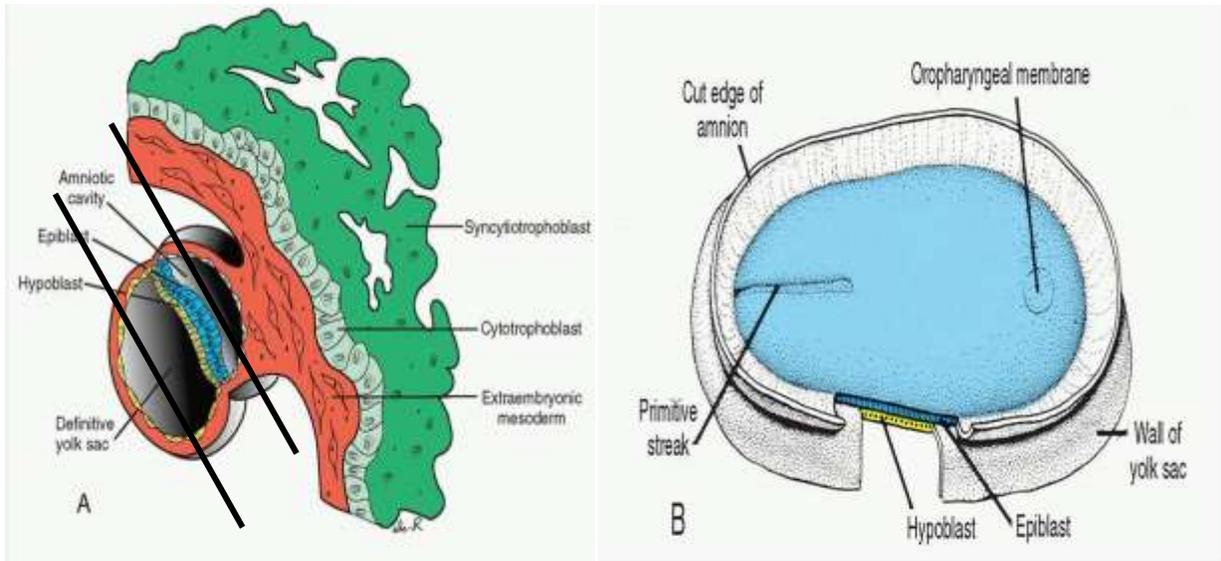
-at embryonic period the heart was consist of (50)cells and in our body it consist of 5 billion cells, another example the brain in the embryonic stage consist of 50 cells and in our body it consist of 1 trillion=1000 billion cells ,that why we advise women to keep away from radiation ,pollution ,smoking and diseases. If one cell in the embryonic stage was degenerated this means 1 billion or more will be lost.

- Rapid development of embryo: starting to enlarge.
- Bilaminar embryo converted to trilaminar embryo with three layers.

\* Second week love number 2, third week love number 3.

- Now we will talk about gastrulation (تكوين المعيّده) :

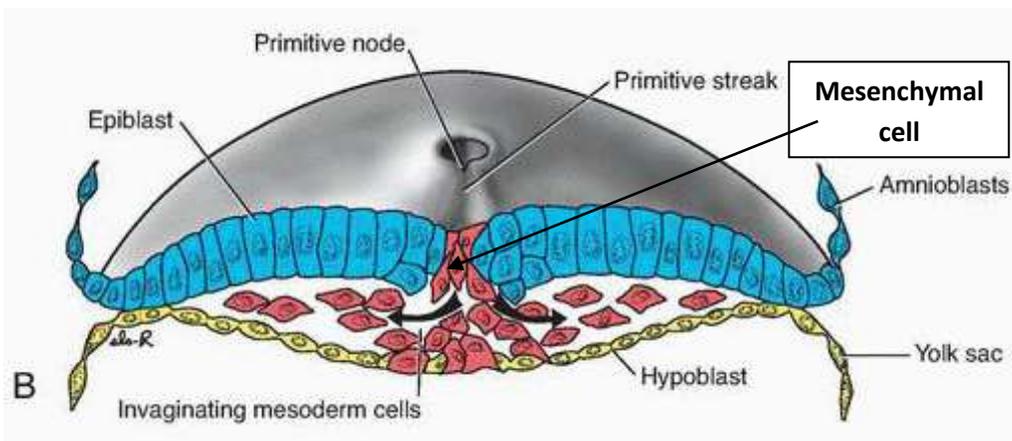
\***Gastrulation**: the process that establishes all three germ layers (ectoderm, mesoderm, and endoderm) in the embryo.



In figure (A) if we remove the roof of the amniotic cavity and the floor of the yolk sac, we will get the figure (B). "Superior view".

\*Gastrulation beginning with formation of the primitive streak."خط بدائي"  
-the epiblast cells will be connected and heap up (massive collection).

\***Primitive streak:** a narrow groove with bulging side appears in the dorsal aspect of the embryonic disc (epiblast) towards the midline. Results from the massive collection of migrated epiblast to the center of embryonic disc.



\*The migrated epiblast to primitive streak will give **mesenchymal cell**.

\***mesenchymal cell:**

- means (loose embryonic connective tissue)

-it's the source of all our body layers."Stem cell ". (From epiblast cells)

**Briefly:** (1-primitive streak formation, 2-epiblast migration, 3- proliferation of epiblast, 4-elevation the edges, 5-mesenchymal formation,...).

1-some mesenchymal cell will invaginate down below the epiblast between epiblast and hypoblast to give mesoderm.

2- Some mesenchymal cell will invaginate down to displace the hypoblast to form endoderm.

3- The remaining mesenchymal cell in primitive streak will form ectoderm.

- At this time (3<sup>rd</sup> week) embryo become 3 layers and it's ready to form organs. (**Gastrulation** finished and **organogenesis** will be start).
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- Derivatives of the 3 germ layers :

-**ectoderm**: epidermis (it's most sensory layer of the skin), nervous system.

If there is a lack in parts of ectoderm due to malnutrition "سوء تغذية" the baby may be suffers from congenital defects in nervous system , that why we advise women to eat well .

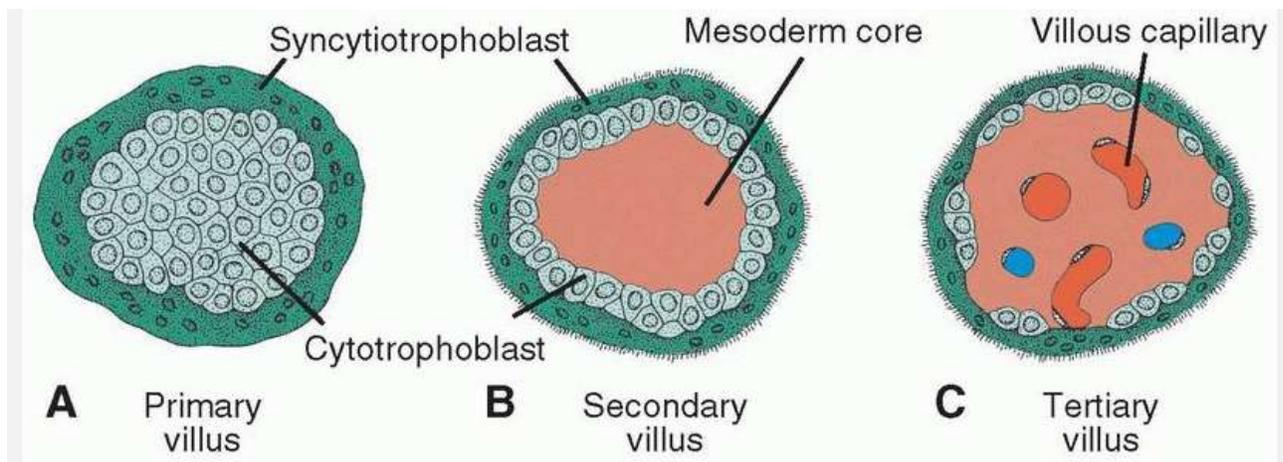
-**endoderm**: mainly give mucosa, epithelium of digestive and respiratory system.

-**mesoderm** (The most important): muscle, connective tissue, bone, cartilage and blood vessels.

\* Any lack in any layer will cause disease such as: heart in the right, Heart hole, one of the cases in the brain if there is a lack in the memory area in the right side, Let's suppose that we have 1000 cell that was migrated, we must know which cells from 1-1000 are responsible about it and after that we grow it to give right side of the memory area.

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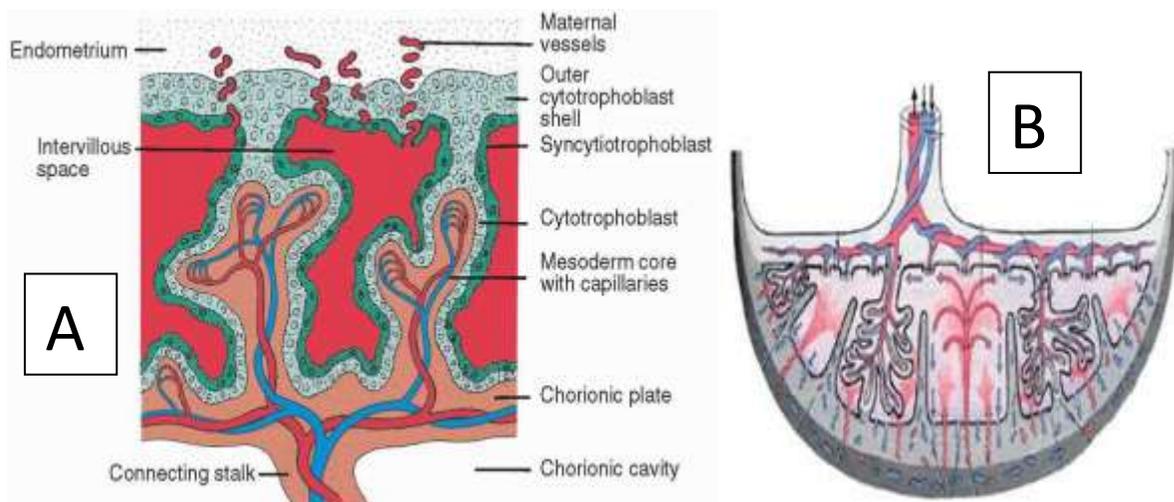
- How Baby is nourished? From the placenta.
- For this moment the blood of Mother doesn't reach the Umbilical cord to be, how the blood will reach? Cytotrophoblast will form finger- like process called primary villi.



-Primary villus (figure (A)): consist from outside syncytiotrophoblast and inside cytotrophoblast. Two layers

-secondary villus (figure (B)): mesoderm will invade and penetrate inside primary villus. 3 layers.

- Tertiary villus (figure (C)): mesoderm will differentiate into blood capillary, also tertiary villus called “**definitive placental villus**”



-By tertiary villus blood of baby start to be close to mother’s blood.

-Mother’ blood go to embryo blood by passing through 3 layers ( syncytiotrophoblast ,cytotrophoblast, endothelium of blood vessels) ,all the three

layers are called “**placental blood barrier**”, it selectively permeable allows to diffusion of blood with essential nutrients and oxygen , and exit waste product from embryo to mother’s blood .

\*blood of **mother** will enter through “endometrial arteries”or “spinal arteries”.

\*blood will go down showering like shower around the branches of tertiary villus.

\*Tertiary villi are bathed by blood of mother; the blood will diffuse through 3 layers to baby, and back from baby to mother by “endometrial veins”.

\*umbilical cord contain one umbilical veins and two umbilical arteries, and **now the heart of baby start to beat (3<sup>rd</sup> week).**

