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TRILAMINAR GERM DISC (3RD WEEK OF DEVELOPMENT)

 \sim The characteristic events in the 3rd week of gestation are:

- 1- <u>Gastrulation:</u> is the process where the three germ layers of the embryo (ectoderm, mesoderm & endoderm) will be formed.
- 2- <u>Primitive streak:</u> which is ill defined line appeared on the surface of epiblast, but at the 15-16 days embryo, it become clear visible groove with slightly bulging region on both sides
- 3- <u>**Primitive node:**</u> at the <u>cephalic</u> end of primitive streak, there's slight <u>elevation</u> over an area surrounding the <u>small primitive pit</u>



o In this week (3⁻), cells of epiblast will be migrate toward primitive streak, before arrival to it, it becomes flask shaped cell, then <u>detached</u> from epiblast & <u>slip</u> inside the streak passing between epiblast & hypoblast.this inward movement called **invagination**.



- Epiblast cell migration is under control of fibroblast growth factor 8 (FGF8) which is a growth factor, protein in nature, synthesized by streak cells control cells migration of epiblast by down regulating E-cadherin, which is protein bind epiblast cells together.
- FGF8 control cell specification into mesoderm by regulating bachyury (T) expression.
- Once the epiblast invaginate through the streak, it will form three creat, three types of cells, then layer:-
 - 1- Some displace hypoblast forming endoderm.
 - 2- Other remains in epiblast forming ectoderm.
 - **3-** Other remains between endoderm & ectoderm forming what is called **mesoderm.**
- Therefore, epiblast through gastrulation process is the source of all germ layers, from which all tissue of the body will be form, these are ectoderm, mesoderm & ectoderm.



Dr.alkhalisy



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- At the point of primitive pit, an indentation in the epiblast will form leaving a canal temporarily <u>connecting</u> amniotic cavity with yolk cavity. This canal called **neurenteric canal.**
- Clocal membrane: formed at the caudal end of embryonic disc. It consists of tightly adherent endoderm with ectoderm with no intervening mesoderm. When this membrane appears the posterior wall of yolk sac form small diverticulum extend into connecting stalk, called allantois or allantoenteric diverticulum. This (allantois) appears around 16th day of development & in lower vertebrates, the allantois serves as a reservoir for excretion product of renal system.



✤ <u>Fate of gastrulation:</u>

Cells migrate through primitive pit will be arranged as follows:

- 1- Cranially: become prechordal plate & notochord.
- 2- Laterally: become paraxial mesoderm.
- 3- Mid-streak region: become intermediate mesoderm.
- 4- Caudally: become <u>lateral plate</u> mesoderm.

GROWTH OF EMBRYONIC DISC

- The embryonic disc changes from flat round structure into broad cephalically , narrows caudally & round elongated structure.
- The primitive streaks continue to supply new cell till end of 4th wk.
- In the cephalic part, germ layer begins differentiation in the mid third wk.

DEVELOPMENT OF VILLI

- By beginning of the 3rd wk, primary villi appear consist of core of cytotrophoblast covered by syncytial layer.
- Then secondary villi appear when mesodermal core covered by single layer of cytotrophoblast ,which in turn covered by syncytial layer.
- At the end of the 3rd week in the core of mesoderm of secondary villi, small blood vessels will appears forming **tertiary villi** or **definitive placental villus**. Here capillary will develop in the mesoderm of chorionic plate & in the connecting stalk.
- At the end of 4th wk when the heart beats, the villus system is ready to supply embryo by O2& nutrients.





THE END