



# ANATOMY



LEC NO. : 21

DONE BY : Nour Al-amoush

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

# CHANGES IN THE 1<sup>ST</sup>, 2<sup>ND</sup>, 3<sup>RD</sup> WEEK

These changes occur after fertilization

Zygote → Starts to divide

# 1<sup>ST</sup> WEEK OF PREGNANCY

## Developmental periods:

- Embryonic period: from fertilization to end of 8<sup>th</sup> week (embryo).
- Fetal period: from 9<sup>th</sup> week to birth (fetus). *حرون الجنين تكون*

## Events during the first week of pregnancy

1) Fertilization. *الإخصاب*

2) Cleavage. *الانقسام*

► Before fertilization the male and female gametes must be transported for the site of fertilization.

*sperm → oocyte*

## Fertilization

👉 **Definition:** The fertilization is the process of fusion of male (spermatozoa) and female (2ry <sup>ovum</sup> oocyte) gametes (pronuclei) to form a zygote. *mature sperm*

👉 **Site:** It takes place in the most dilated part of the uterine tube - Ampulla. *أوسع مكان*

👉 **Time:** It takes place within 24 hours of ovulation. *لوحصل بعد صياك ما يفيد، لأنه البويضة خلص ماتت .*

# 1<sup>ST</sup> WEEK OF PREGNANCY

👉 **Preparation for Fertilization:** → *capitulation*  
→ *acrosomal reaction*

## (a) Capacitation

- It is a process of **removal** of plasma proteins from plasma membrane from head region (**Acrosome**) of spermatozoa in the **cervix** of uterus. *عنق الرحم*
- It takes about **7 hours**. Only capacitated sperm undergoes acrosome reaction and fertilizes the ovum.

## (b) Acrosomal reaction

*بوجود إفراز لبعض enzymes من head of sperm*

- In surrounding area of oocyte. (in fallopian tube)
- During acrosomal reactions the following **enzymes** are needed:-
  - Hyaluronidase** enzyme to penetrate **corona radiate**. *هدم طبقة عن جدران حماية*
  - Trypsin-like-substance** and **acrosin** to penetrate **zona pellucida**. *glycoproteins*

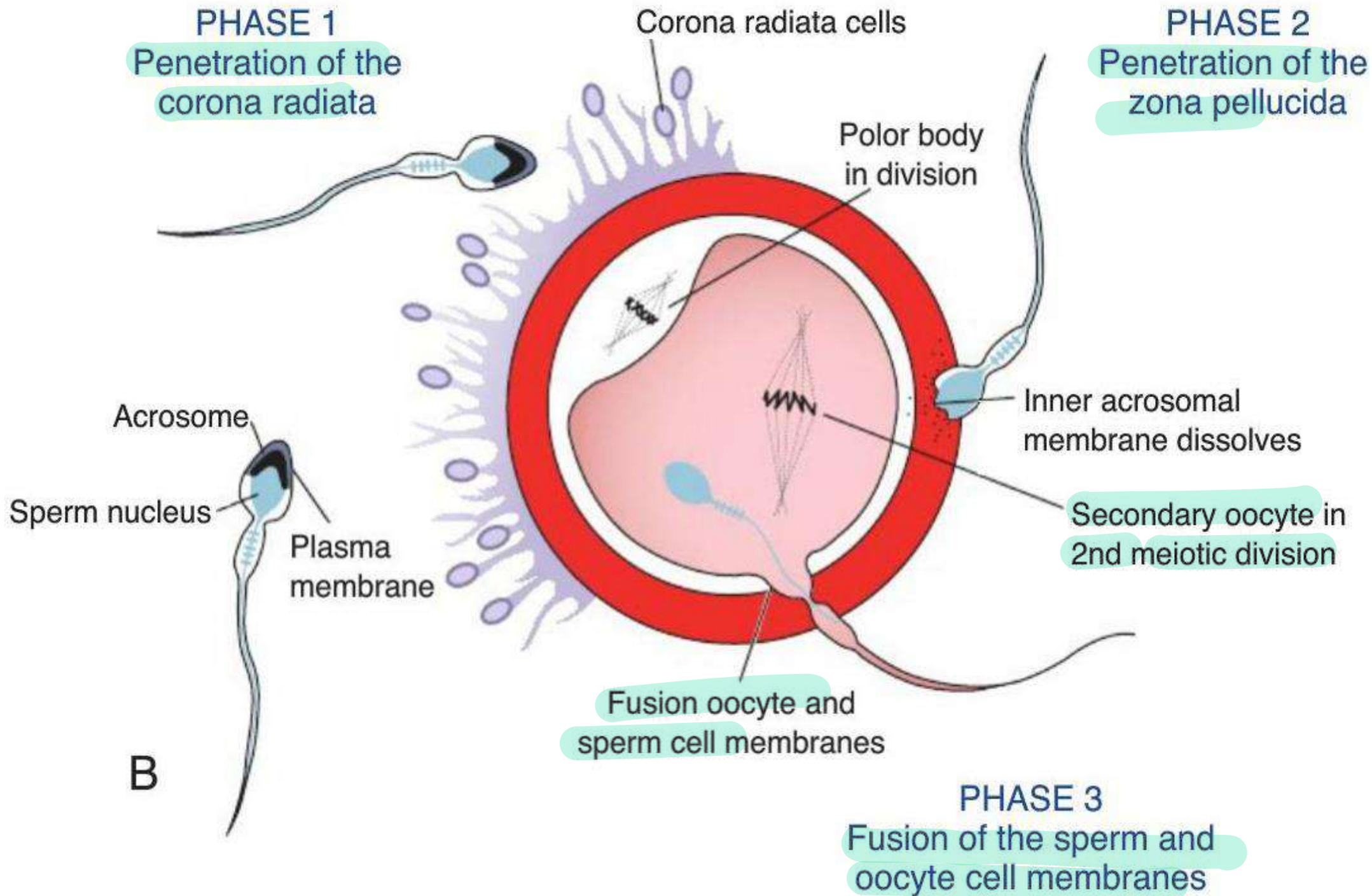
## 👉 **Movement of the sperms to the oocyte:**

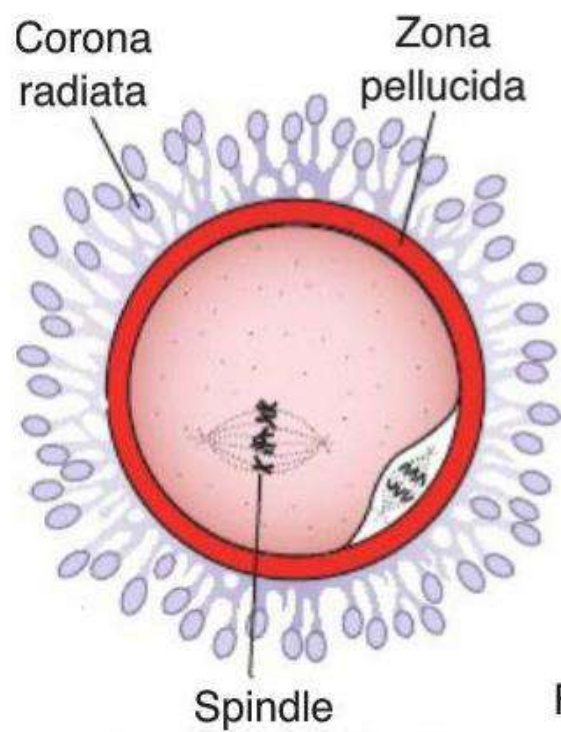
- The sperms takes about **2-7** hours from the **cervix** to the **isthmus** of the tube.
- Majority of sperms **dies** within **24 hours**. *قرب من uterus*

# 1<sup>ST</sup> WEEK OF PREGNANCY

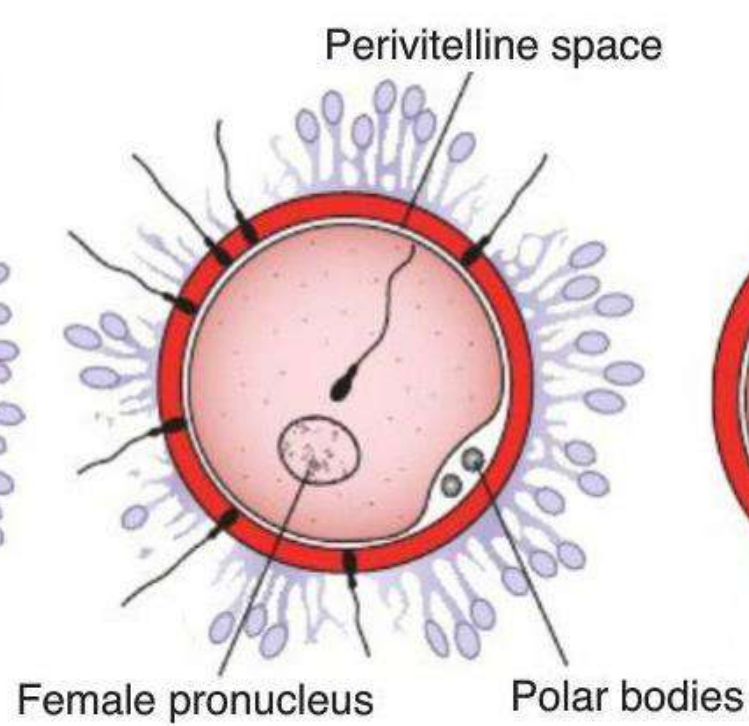
## 👉 Steps of Fertilization:

- 1) **Penetration of the corona radiata:** by hyalurindase, tubal enzymes
- 2) **Penetration of the zona pellucida:** by **acrosin**, **esterase** and **neuroaminidase**, which allow sperm to reach the cell membrane.
- 3) **Fusion of plasma membranes of the oocyte and sperm:** The **head** and **tail** of sperm enter the cytoplasm of the oocyte, but plasma membrane of sperm remains behind.
- 4) **Zona (cortical) reaction:** *منع سجدًا المنع دخول أكثر من sperm*
  - **Definition:** structural changes at zona pellucida to prevent other sperms from penetration of the oocyte.
  - These reactions prevent **polyspermy** (penetration of more than one spermatozoon into the oocyte).
- 5) **Completion of second meiotic division of oocyte** and formation of **female pronucleus** and the **second polar body**.
- 6) **Formation of male pronucleus** and the tail of the sperm degenerates.
- 7) **Union of the pronuclei:** this will lead to formation of **zygote with 46 chromosomes**.

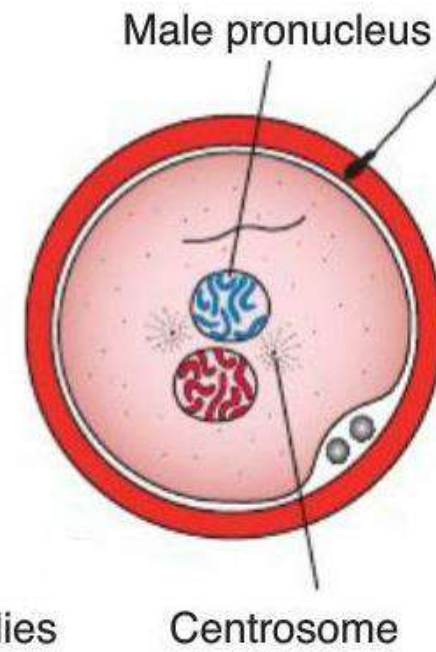




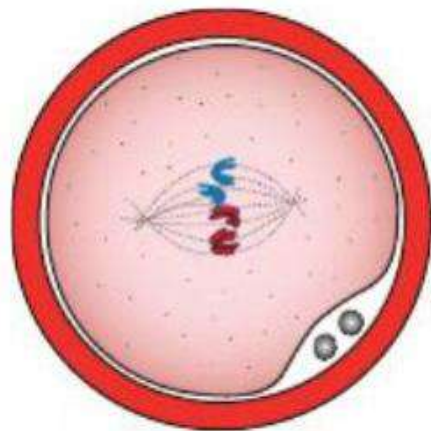
Oocyte immediately after ovulation,



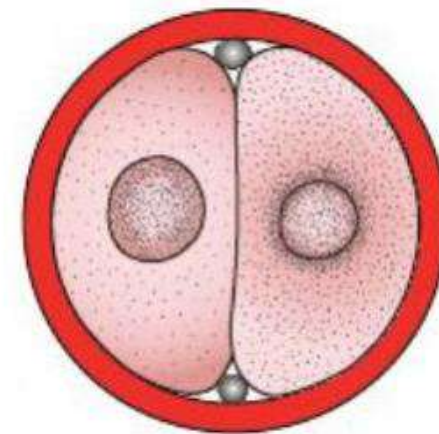
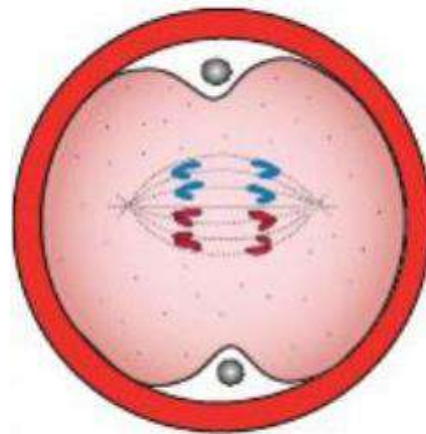
A spermatozoon has penetrated the oocyte,



Male and female pronuclei.



Chromosomes become arranged on the spindle, split longitudinally, and move to opposite poles.



Two-cell stage.



# 1<sup>ST</sup> WEEK OF PREGNANCY

## 👉 Results of Fertilization:

1. The 2n oocyte completes the second meiotic division. لوما حصل إخصاب مارج  
2nd division تكمل
2. Restores the normal diploid number of chromosomes (46) in the zygote (the newly formed cell). haploid → diploid.
3. Determines the sex of the embryo. xx (female) xy (male)
4. Initiation of cell division of zygote.

## 👉 Abnormalities of Normal Fertilization:

1. **Parthenogenesis:** البويضه تنقسم بدون إخصاب The unfertilized oocyte starts cleavage without sperm penetration.
2. **Polyspermy including dispermy and triploidy:** more than — Ovum fertilized by 2 sperms two 2 sperms sperms, resulting in a zygote with 69 chromosomes. إكثرت أصلهون ما يتولد

## ▶ Cleavage and Blastocyst Formation

### ▶ Cleavage

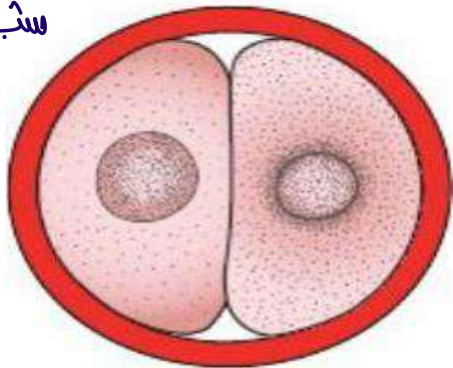
▶ **Definition:** Process of repeated mitotic division of **zygote** resulting in rapid increase in number of cells (blastomeres). النطفة  
الهدف انه يزيد عدد الخلايا

→ 1st, zygote divides into two blastomeres then to 4 blastomeres.

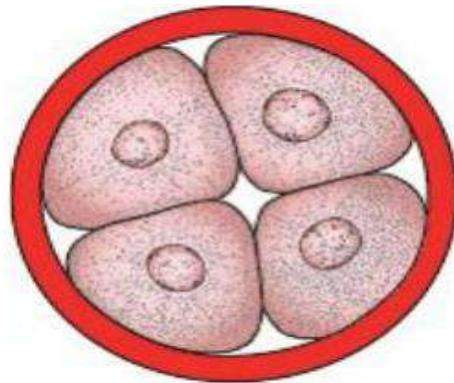
→ During cleavage, zygote is within the thick zona pellucida.

→ When there are 12 to 16 blastomeres the embryo resembles a mulberry fruit and is called **morula** which formed 3 days after fertilization.

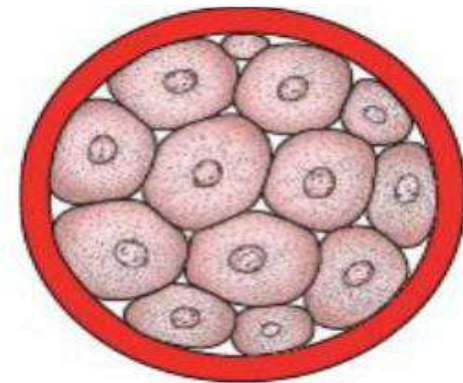
شبه التوت



Two-cell stage



Four-cell stage



Morula

Development of the zygote from the two-cell stage to the late morula stage.

## 👉 Formation of blastocyst العلقة

1. **Blastomeres** of morula undergo repeated mitotic division within zona pellucida.
2. **Zona pellucida:-** Keep cells together during cleavage and Prevent adhesion of these cells to uterine tube.
3. Small cavities appear between the blastomere and unite together to form larger cavities.
4. **Blastocele:**
  - ⇒ Appears 4 days after fertilization.
  - ⇒ It is fluid filled cavity inside morula.
  - ⇒ Source of this fluid is from uterine cavity via zona pellucida.
  - ⇒ It divides the blastomere into two group of cells:-

# 1<sup>ST</sup> WEEK OF PREGNANCY

مسؤول عن التغذية

1) **Outer cell mass [trophoblast] (tropho=related to nutrition).**

2) It will give rise to Trophoblast layer which is responsible for nutrition and protection.

3) Give embryonic part of the placenta.

2) **Inner cell mass (embryoblast):-**

هناك تكون الجنين

3) Projects in the form of a mass into the cavity of blastocyst.

4) Will develop into the tissues of the embryo.

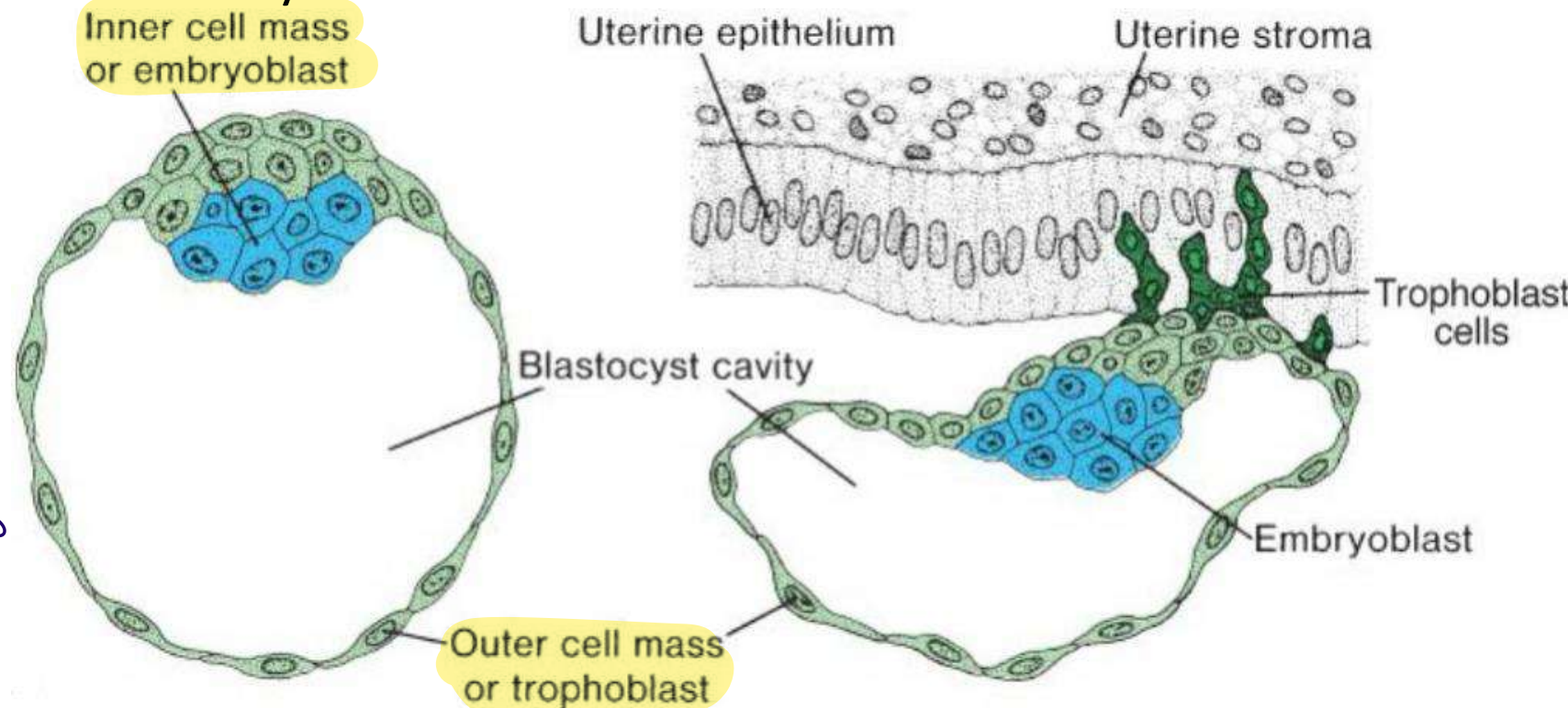
## Embryonic poles:

➔ The blastocoele now has 2 poles:

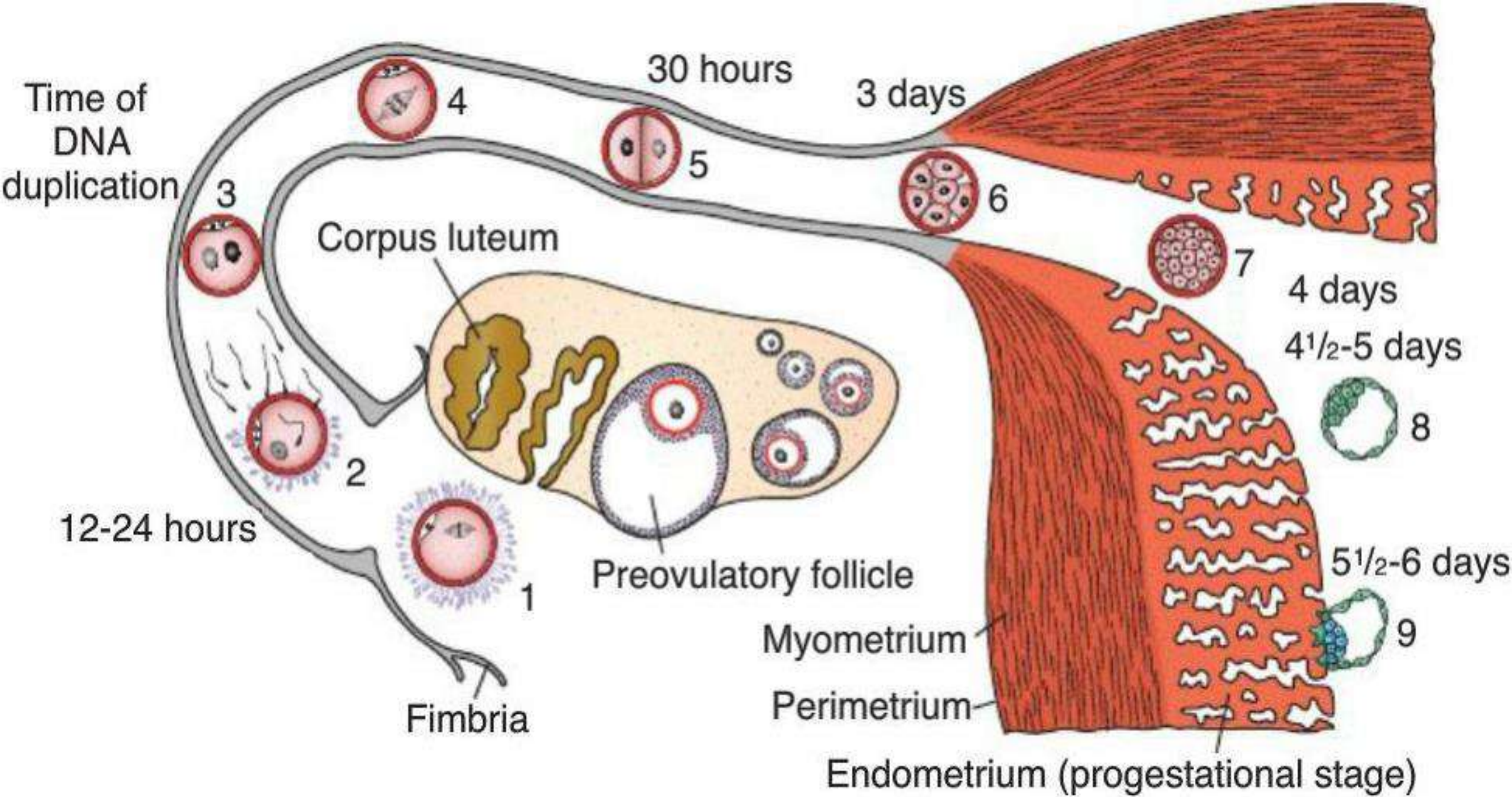
1. **Embryonic pole (implantation pole) :** towards the endometrium of the uterus.

هذا القطر المائل

2. **Abembryonic pole:** towards the cavity of the uterus.



Schematic of a human blastocyst showing inner cell mass and trophoblast cells.



Events during the first week of human development.

### ■ Events during the second week of pregnancy

- 1) Implantation of the blastocyst. *بزرع في المكان المناسب فيها*
- 2) Decidua formation. *endo → Decidua*
- 3) Blastocyst changes in 2nd week of pregnancy. *بحسب تخيري سألها*

# 1) Implantation

- **Definition:** process of embedding of blastocyst in the endometrium.
- **Time:-** **Begins:** at the end of 1st week. **Ends:** by the end of 2nd week.
- **Normal site of implantation:-** <sup>ههنا</sup>

لو طلعت من هاد المكان بصير عن مشال

- 1) Endometrium of **Upper part of the Body of Uterus [near fundus]**
- 2) On the **Posterior wall** more than anterior wall
- 3) Near **Middle line.**

- **Processes:** <sup>glycoprotein</sup> <sup>بسيب</sup> <sup>implantation</sup> <sup>موجودة</sup> <sup>ما</sup> <sup>بجس</sup> <sup>زونا</sup> <sup>ضلت</sup> <sup>لو</sup>

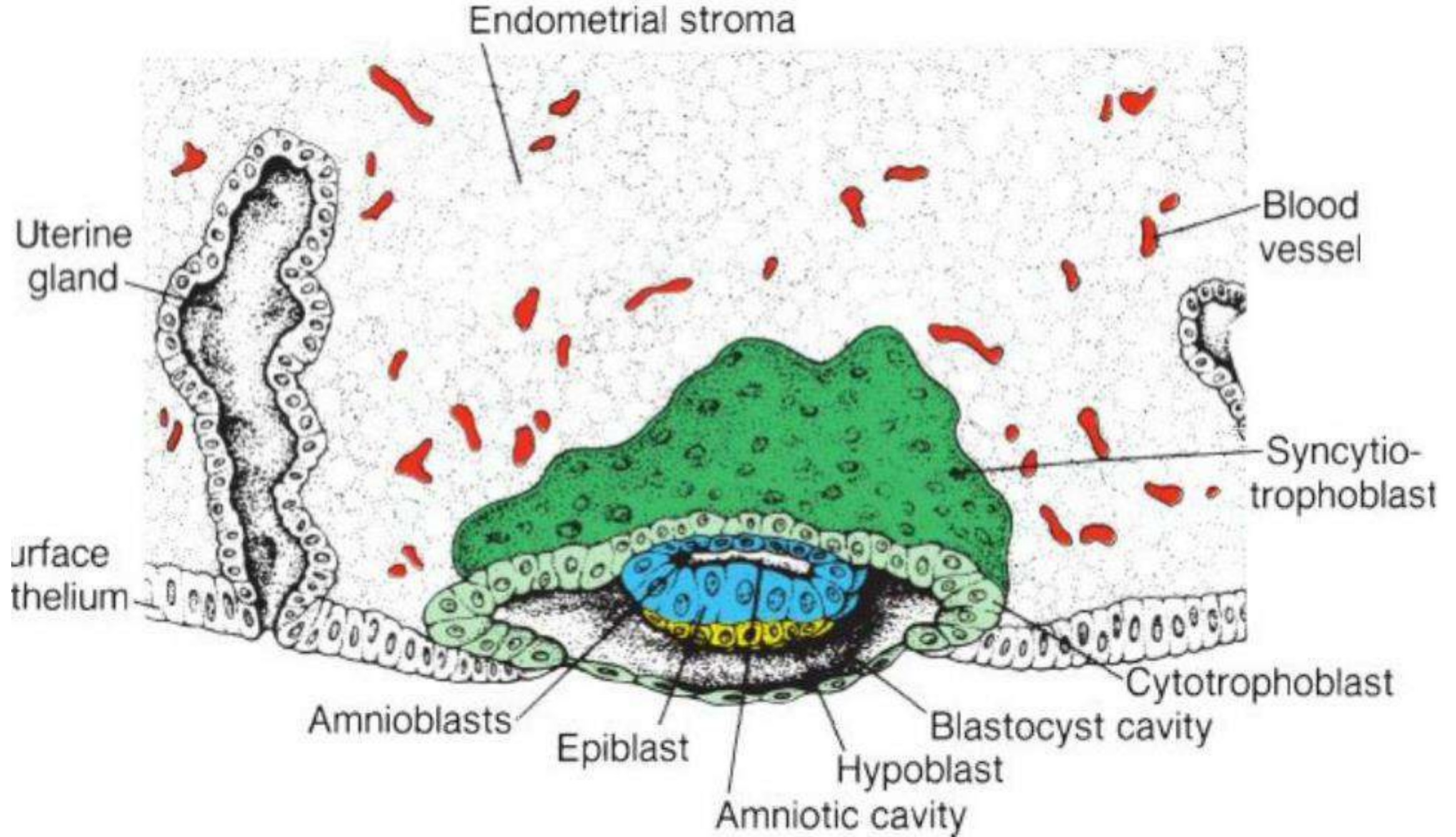
1) **Zona pellucida surrounding blastocyst** **Degenerates** resulting in: Enlargement of blastocyst and Exposure of **trophoblast** that is differentiated into:

- ▶ **outer syn-cytio-trophoblast.** → <sup>مسؤول عن تغذية الجنين</sup> / <sup>endo</sup> <sup>هاد الجزء لبسك ب</sup>
- ▶ **inner cyto-trophoblast.** → <sup>نقل التغذية من endo</sup>

## 2<sup>ND</sup> WEEK OF PREGNANCY

- Exposure of trophoblast has two functions:-
  - a. **Adhesive power**: makes blastocyst adheres to endometrium.
  - b. **Histolytic power**; produced by proteolytic enzymes released from syncytiotrophoblast and promote **lysis** of endometrial tissue leading to:
    - a. **Lysis of glands and c.t.** → formation of defect in the endometrium → blastocyst gradually embeds in endometrium. *صعود الإفرازات بتطالع وترشح للجنين*
    - b. **lysis of blood capillaries** → oozing of blood to fill lacunae in syncytiotrophoblast. *صعود الدم ليجمع حوالين الجنين والدم يحتوي على  $O_2$  وتغذية و ممان الجنين ياخذ التغذية من صون*
- **Blastocyst**:
  - a. Implants in the endometrium at its **embryonic pole**.
  - b. The defect in the endometrium is filled by fibrin clot. *بحين قطع الطبقة المتصلة مع بعضها ف اشتركت ب Fibrin clot يلي من الدم*
  - c. The defect in the endometrial epithelium gradually disappears as the endometrium epithelium is repaired. *صون Blastocyst دخلت جواره endometrium وهو غطاها*





A 7.5-day human blastocyst, partially embedded in the endometrial stroma.

## 2<sup>ND</sup> WEEK OF PREGNANCY

### - Abnormal sites of implantation

#### A. In uterus: (Placenta Praevia)

ببطالة فوق قريب من fundus

- **Definition:** implantation of a blastocyst in the inferior segment of the uterus. near the internal os of cervix.

#### - Types:

▶ **Placenta previa lateralis:** not related to internal os of cervix. → بجيدة عندها

▶ **Placenta previa marginalis:** partially covers internal os of cervix.

▶ **Placenta previa centralis:** completely covers internal os of cervix. → جاية عليها بالزبط

#### B-Extrauterine:- Ectopic Pregnancy → برا الرحم

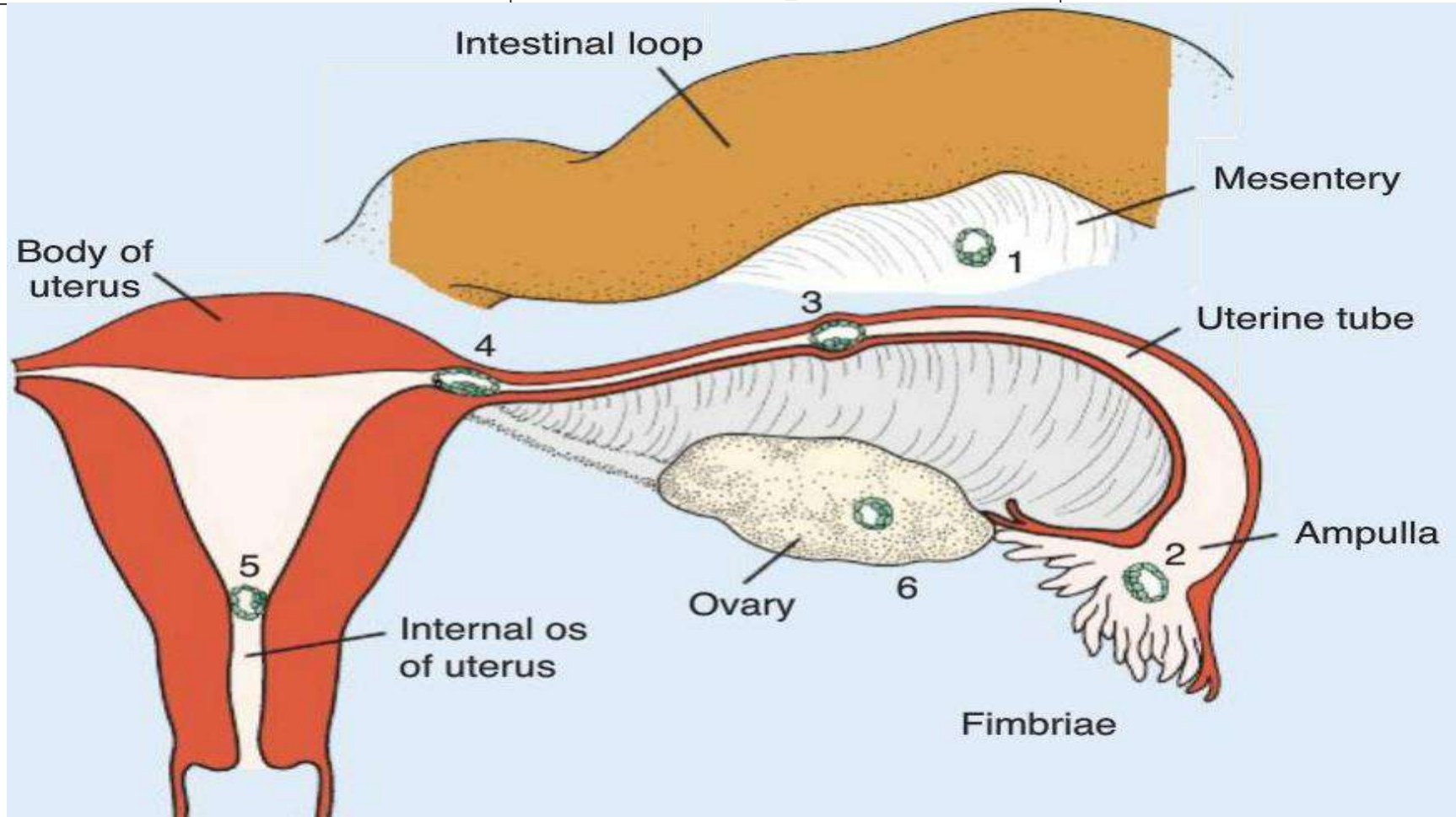
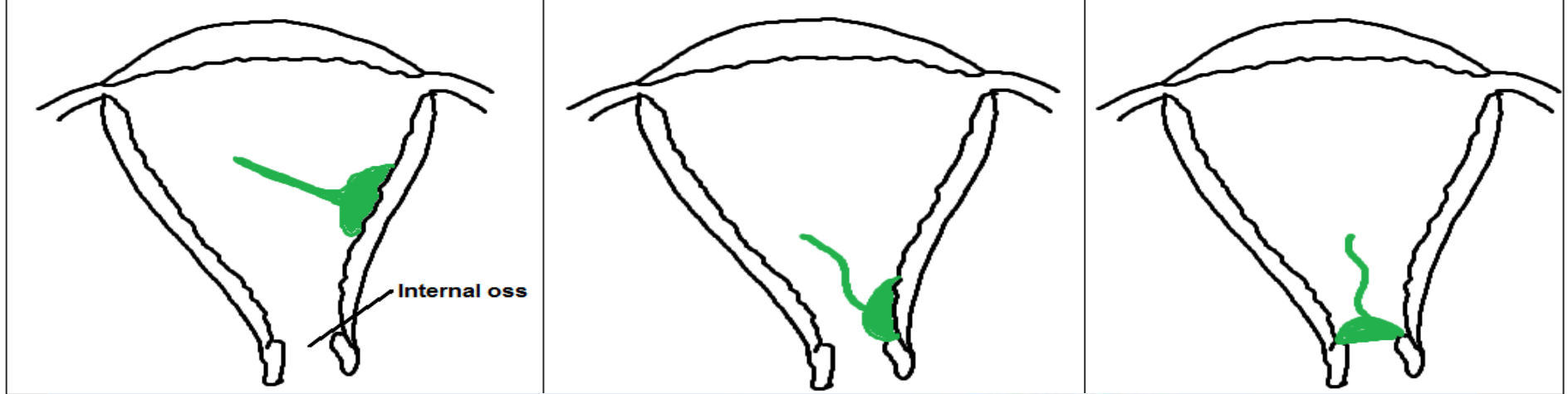
- **Definition:** blastocyst implant outside the uterus.

#### - Types:-

1) **Ovarian pregnancy:** The fertilized ovum is implanted on the ovary بحير الحمل في المبيض

2) **Tubal pregnancy:** Commonly in ampulla and isthmus of the uterine tube.

3) **Abdominal (peritoneal) pregnancy:-** Commonly over the surfaces of abdominal viscera. بروج على abdominal organs



### 2) Decidua formation

- **Definition:** is the endometrium of the pregnant uterus.

- **Parts:** formed of three parts:-

جاي ناحية الجنين / هي الموصلة بين بدئ الحمل والجنين

1) **Decidua basalis:** Part of endometrium lies between foetus and myometrium.

2) **Decidua capsularis:** Part of endometrium covers foetus. مغلقة الجنين

3) **Decidua parietalis:** Part of endometrium lines the rest of uterine cavity. مبطنه جدار الرحم

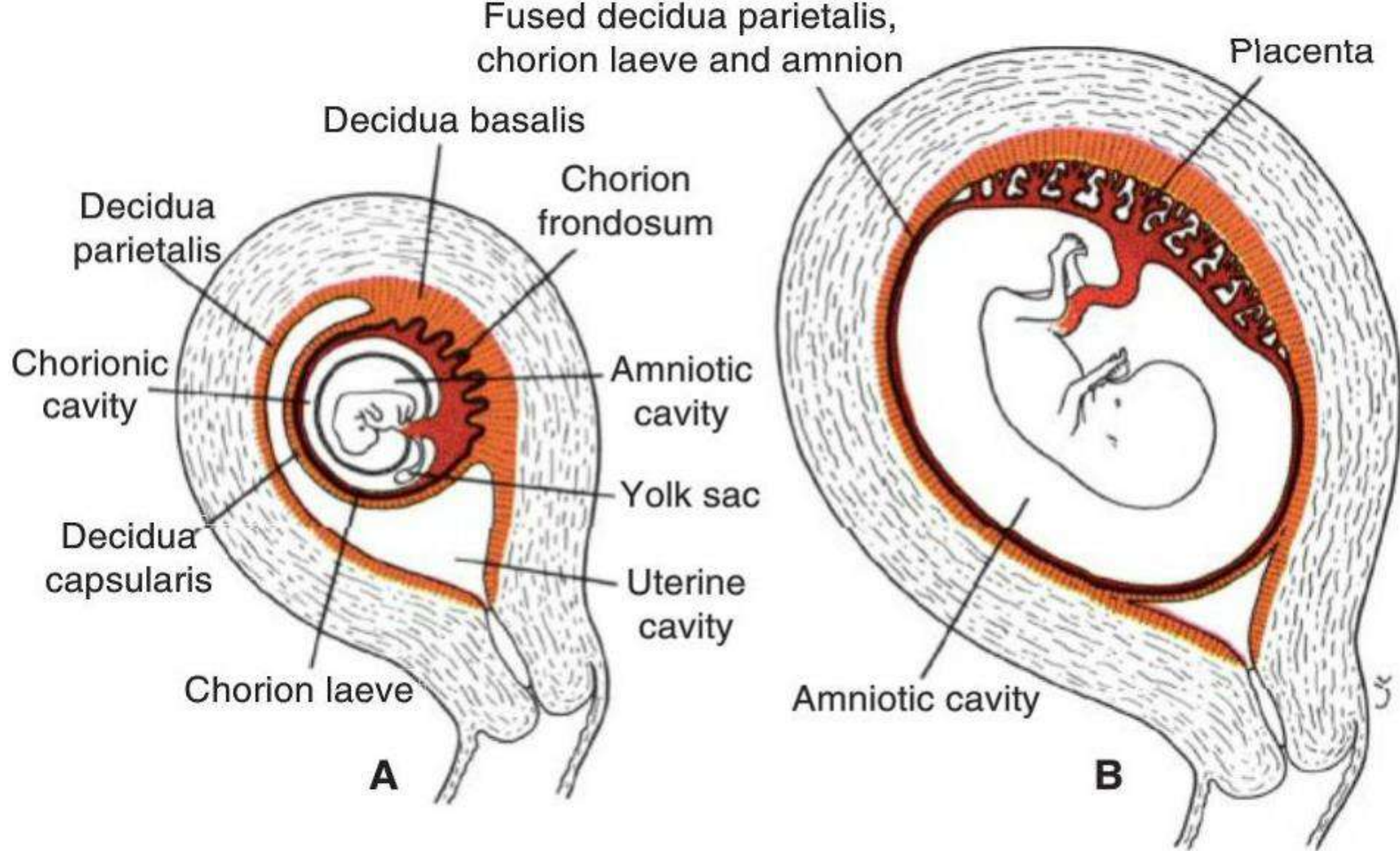
- **Fate:**

1) **Decidua basalis:** becomes hypertrophy to form the maternal part of placenta. المشيمة

fetal part  
maternal part

2) **Decidua capsularis & parietalis:** basalis يتخذوا مع بعض، مع الضغط الدم يقل ف بصير لهم تحلل و بضل بس

▪ Growth of embryo leads to opposition and fusion of deciduas capsularis and parietalis. resulting in obliteration of uterine cavity and reduction of blood supply to deciduas capsularis and parietalis leads to degeneration and disappear.



**Relation of fetal membranes to wall of the uterus.**  
**A. End of the second month. B. End of the third**

## 2<sup>ND</sup> WEEK OF PREGNANCY

hypoblast, epiblast : انا عندي inner thin mass تنقسم الى طبقتين

### 3) Changes in Blastocyst

- (a) Changes in embryonic disc (2)
- (b) Changes in the cavities: (2)
- (c) Changes in wall (2)

#### a) Changes in embryonic disc

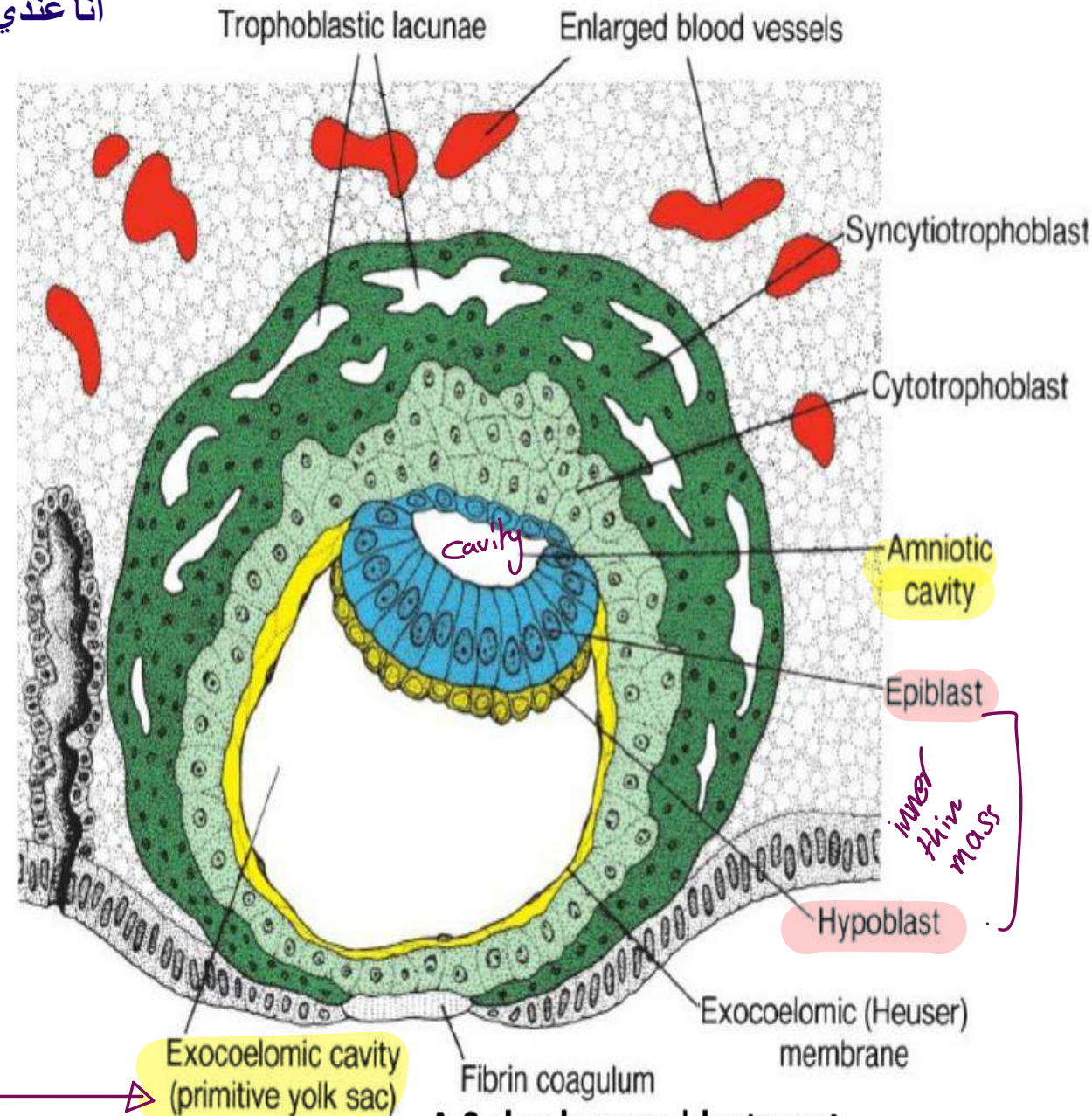
Inner cell mass is changed into two layers:-  
غرف

##### a. Epi-blast [primary ectoderm]

- i. upper thicker layer.
- ii. high columnar cells.
- iii. related to amniotic cavity.

##### b. Hypo-blast [primary endoderm]

- i. lower thin layer.
- ii. small cuboidal cells.
- iii. related to primary yolk sac.



A 9-day human blastocyst.

## 2<sup>ND</sup> WEEK OF PREGNANCY

### b) Changes in the cavities: formation of

#### 1) Amniotic cavity:

- ⇒ New smaller & dorsal cavity appears in inner cell mass.
- ⇒ **Floor**:- formed of epiblast.
- ⇒ **Roof & sides**: formed of flat cells called amnioblastic cells derived from epiblast cells.

#### 2) Primary yolk sac:

- ⇒ **Blastocele** cavity → primary yolk sac.
- ⇒ **Roof**: formed of hypoblast
- ⇒ **Floor & sides** : formed of flat cells (exocoelomic "Heuser" membrane) derived from hypoblast cells.

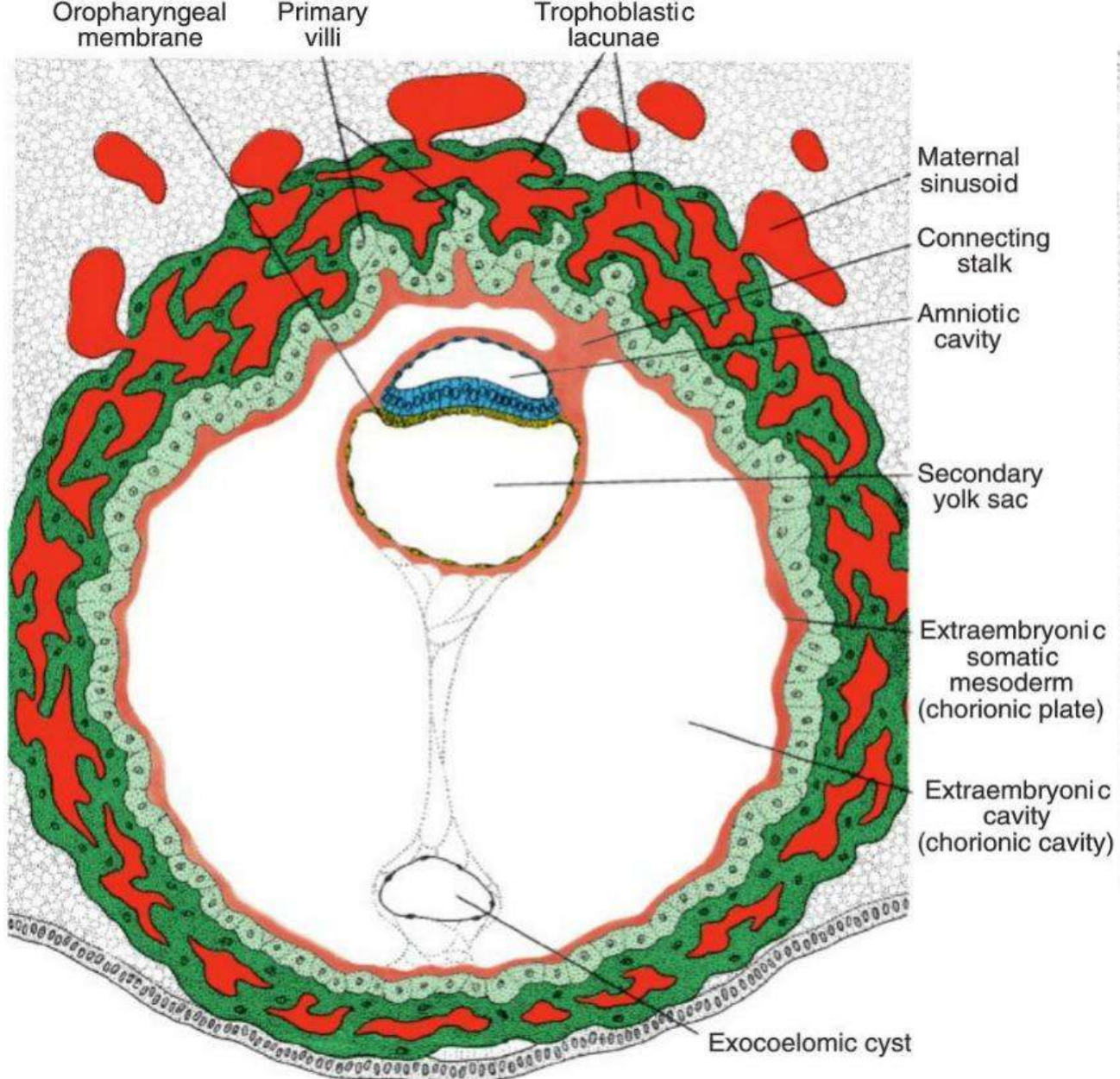
or cavity  
بداً استتاه من بين كمان cavity

### c) Changes in wall: epiblast نسيج متوسل / مفصل

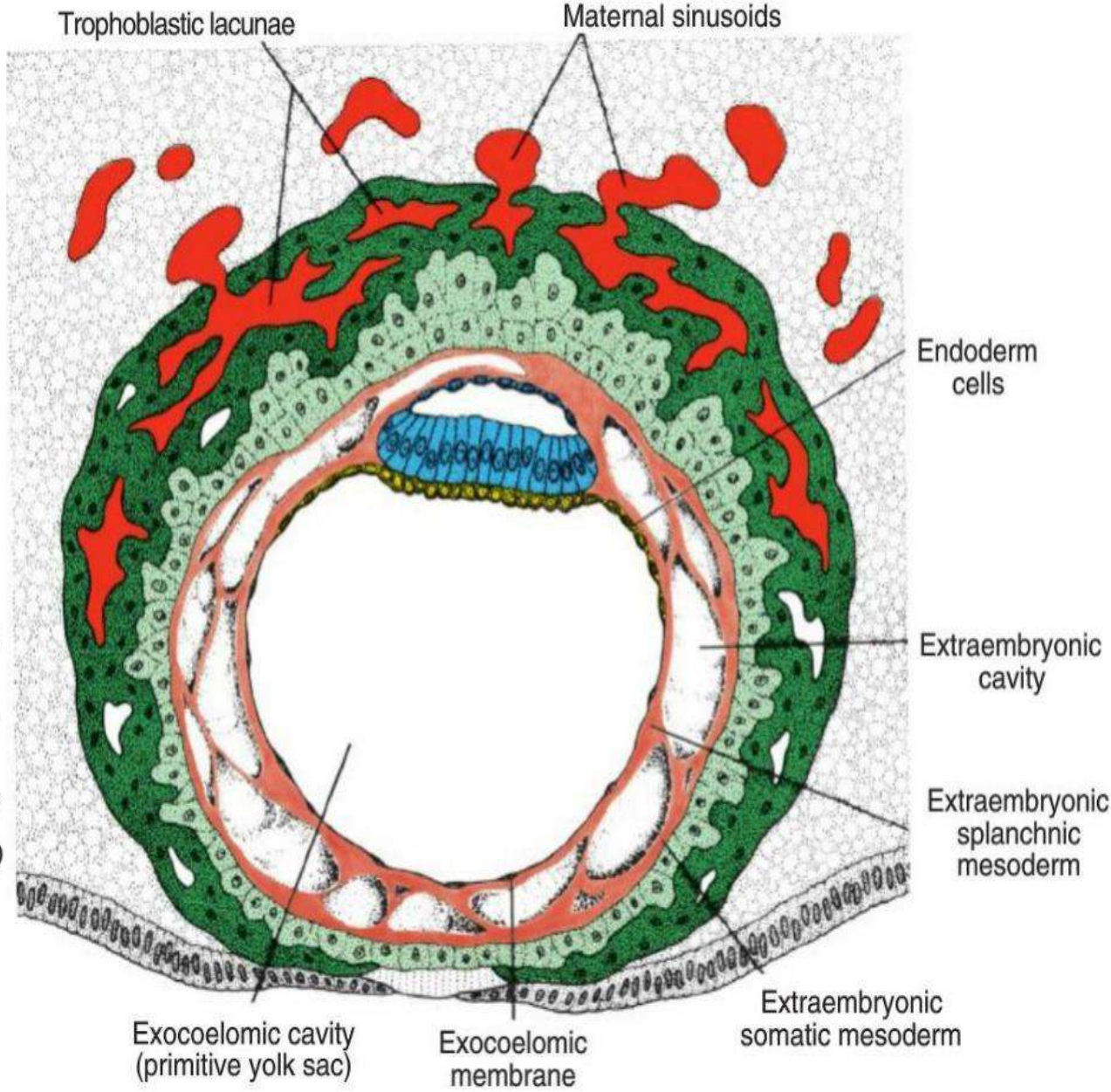
#### Development of extra-embryonic mesoderm & extra-embryonic coelom ( EEM & EEC) Cavity برهنو.

The exocoelomic "Heuser" membrane **Increases in thickness** and **Isolated spaces** appear within it. Cavities

These Spaces rapidly fuses together to form a large cavity called extra-embryonic coelom



A 13-day human blastocyst. showing trophoblastic lacunae at the embryonic as well as the abembryonic pole, the primary villi and the extraembryonic coelom or chorionic cavity. The secondary yolk sac is entirely lined with endoderm.



Human blastocyst of approximately 12 days. Extraembryonic mesoderm proliferates and fills the space between the exocoelomic membrane and the inner aspect of the trophoblast.



## 2<sup>ND</sup> WEEK OF PREGNANCY

As a result of formation of the coelom, the extra embryonic mesoderm is divided into two layers:-

a. **Extra-embryonic SOMATIC mesoderm**:<sup>walls</sup> - it is the part of the (EEM) that is:

- 1- line trophoblast.
- 2- cover the amniotic cavity.

b. **Extra-embryonic SPLANCHNIC mesoderm**: - it is the part of the (EEM) that is cover the primary yolk sac.  
↓ يعود إلى الأختصاص

**Division of (EEM) is not complete**: mesodermal mass remains connecting the two layers at caudal end of embryonic disc called **connecting stalk (future umbilical cord)**. → يتكون منه الحبل السري

### Division of Trophoblast

- Trophoblast differentiate into two layers:

**Outer syncytiotrophoblast**: multinucleated cytoplasmic mass without boundaries

**Inner cytotrophoblast**: mononucleated cells.

- **Function:**

1- isolated cavities [ LACUNEA ] appear. become filled with mixture of maternal blood from ruptured endometrial capillaries. The adjacent lacunae fuse to form lacunar network which are primordial for intervillous space of placenta.

2- produce H.C.G. which enters maternal blood  
ح نشوفه لقدام  
مستول من اختيا  
الحمل

## Changes in 3rd week includes:

1. Changes in the structure of the bilaminar embryonic plate
2. Changes in the trophoplast (chorion)

**Gastrulation** is the formative process by which the three germ layers, which are precursors of all embryonic tissues, and axial orientation are established in embryos.

Any structure consists of

- ecto      خارج
- endo      داخل
- meso      ما بين

**During gastrulation**, the bilaminar embryonic disc is converted into a trilaminar embryonic disc.

كان طبقتين صار في

تكوين الأشكال الجنين من الأعضاء

**Gastrulation is the beginning of morphogenesis** (development of body form) and is the significant event occurring during the third week.

## 3<sup>RD</sup> WEEK OF PREGNANCY

### 1. Development of **prechordal plate**: *هو الذي رح يكون الفم*

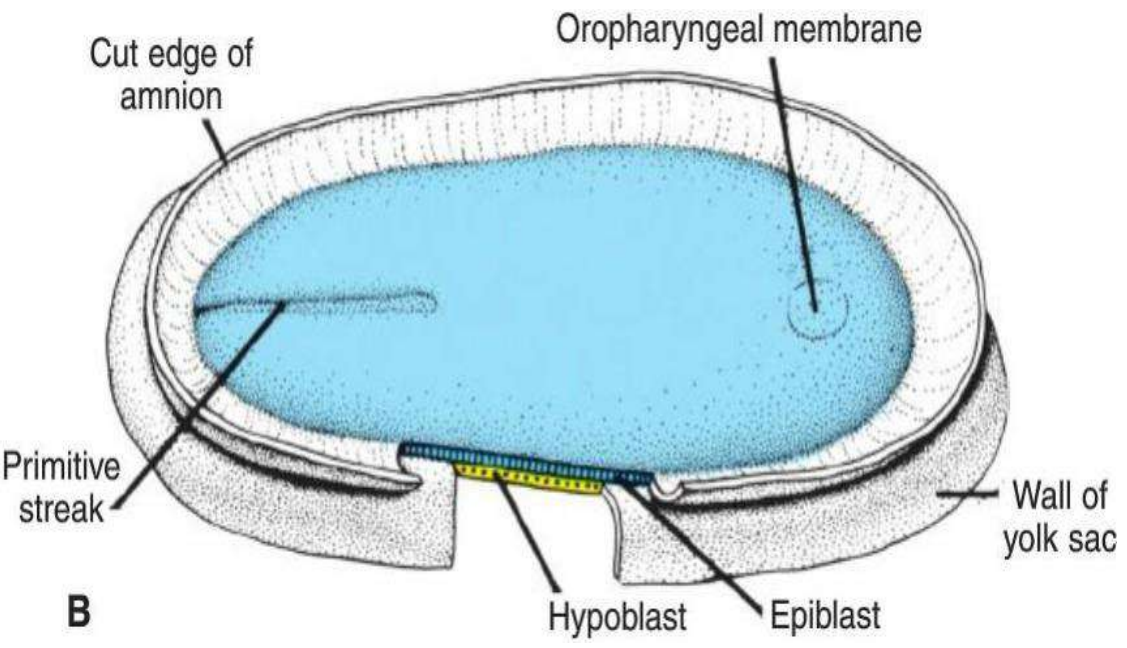
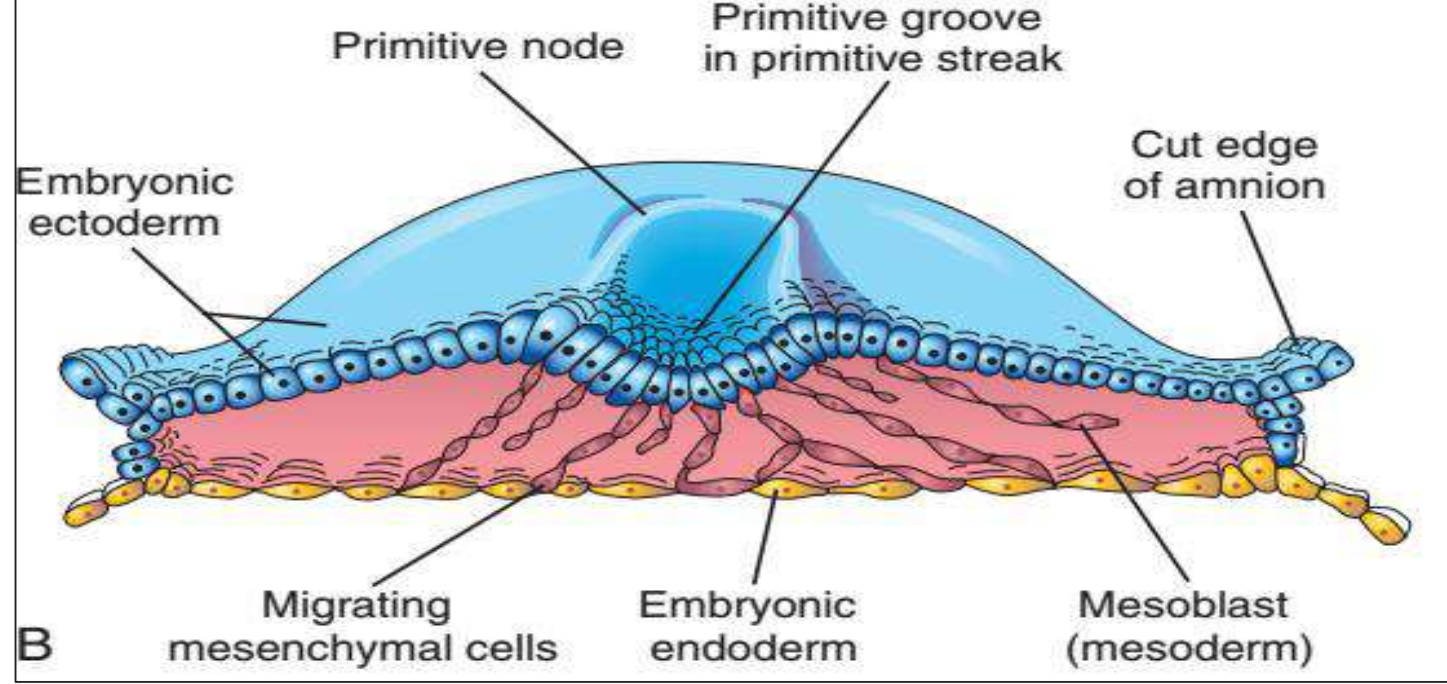
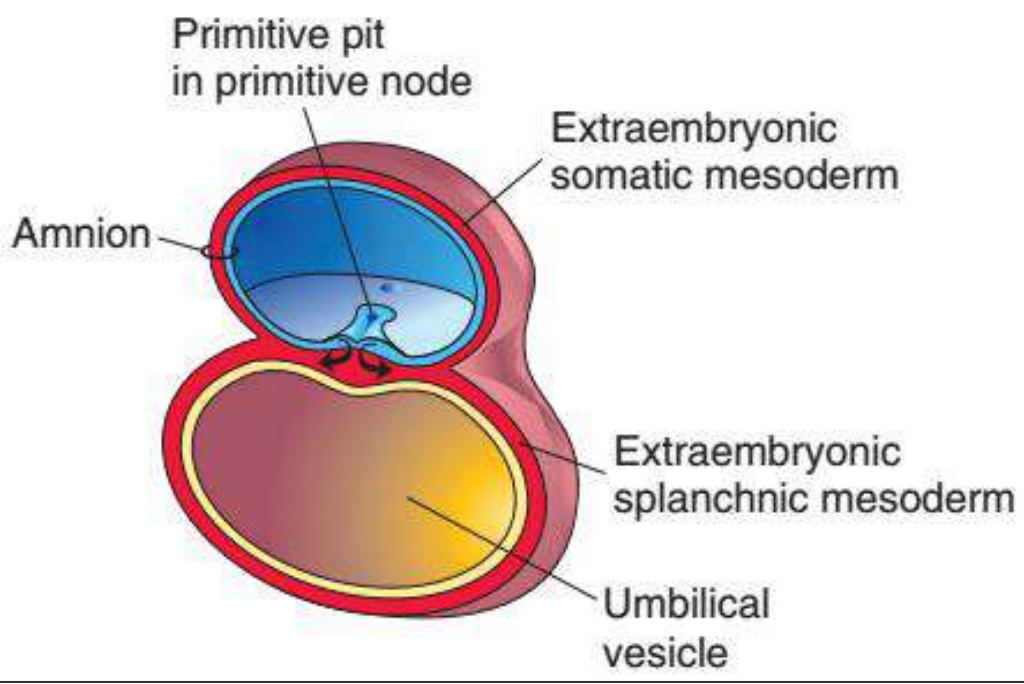
- On the 14th day, **cranially** in the middle line the prechordal plate is formed (future mouth).

### 2. Development of **primitive streak**: *جبل منخ، بلجي قريب من المنتصف*

- On the 15th & 16th days, the epiblast cells at the caudal end migrate to the median plane towards cranial end forming the primitive streak which proliferates to form a **primitive node** <sup>عقدة</sup> & small depression in the primitive node appears called the **primitive pit**. *هون تستبدل ال endoderm, hypo*

### Function of the primitive streak in the developing embryo:

1. Formation of the **3 layers** (ectoderm, endoderm and mesoderm) → ???.
2. Formation of the **notochord**.
3. Determination of the **axes** of embryo (cranio-caudal, dorso-ventral & right-left) axes.
4. Stimulate the appearance of **the nervous system**.



## 3<sup>RD</sup> WEEK OF PREGNANCY

### 1. Formation of ectoderm, mesoderm & endoderm (Gastrulation):

**Epiblastic** cells near the primitive streak proliferate & migrate through the **primitive streak**.

1. Some cells migrate **to replace the hypoblast** and form **endoderm** on 14th & 15th days.
2. The next cells to migrate pass between the **epiblast and the hypoblast** to form **intra-embryonic mesoderm**.
3. The rest of the cells of **the epiblast will form the ectoderm**.
4. Now the embryonic disc contains 3 layers (**ectoderm, endoderm & mesoderm**).

### 2. Development of notochord → not Nervous system

- Cells that migrate through the **primitive pit** in the midline between the ectoderm & endoderm will **form the notochord**.

. mesoderm ↓  
↓  
mesoderm

- This newly formed notochord will be the **core around** it the **vertebral column** will be formed.

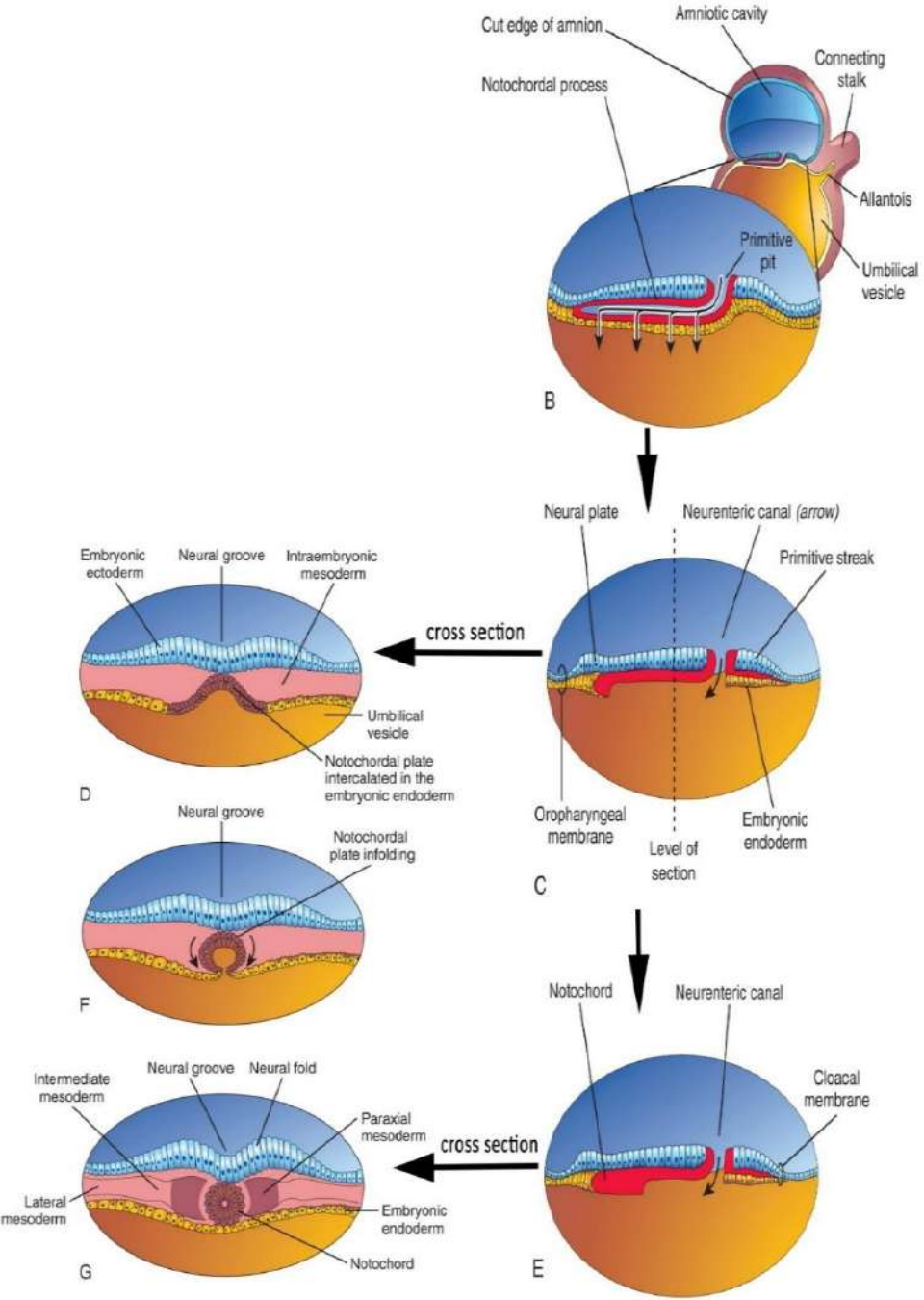
### Stages of development:

**Notochordal process** on the 17th day → **Notochordal canal** on the 18th day → **Neurenteric canal** (transient communication between amniotic fluid & yolk sac cavities through neurenteric canal) on the 19th day → **Notochordal plate** → **Notochord** on 20th day.

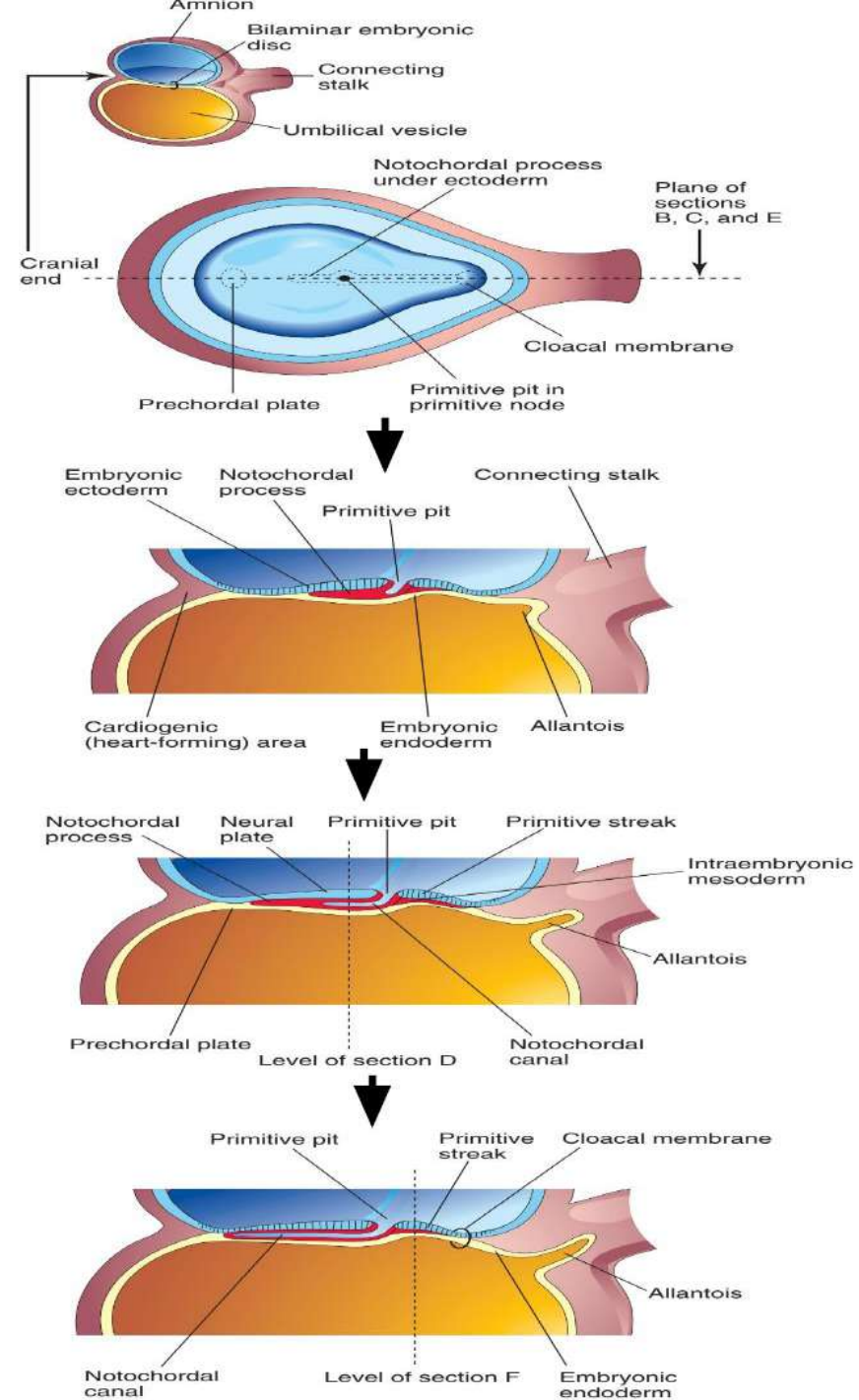
هو الجزء السفلي من Canal اختفى

### Fate of notochord:

1. Cranial part: forms → basilar part of occipital bone & a part of body of sphenoid.
2. The central part of notochord: degenerates.
3. Part of notochord in the intervertebral disc: → from nucleus bulbosus.



Illustrations of notochord development by transformation of the notochordal process.



Illustrations of developing notochordal process.

Nervous system originates from ectoderm

3<sup>RD</sup> WEEK OF PREGNANCY

## Development of neural tube (Neurulation).

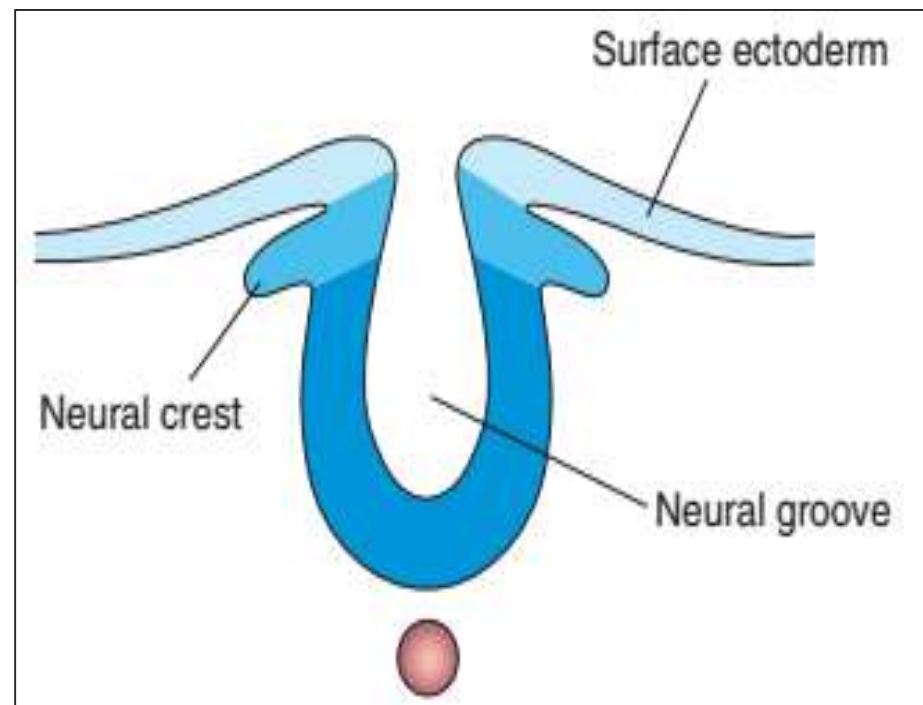
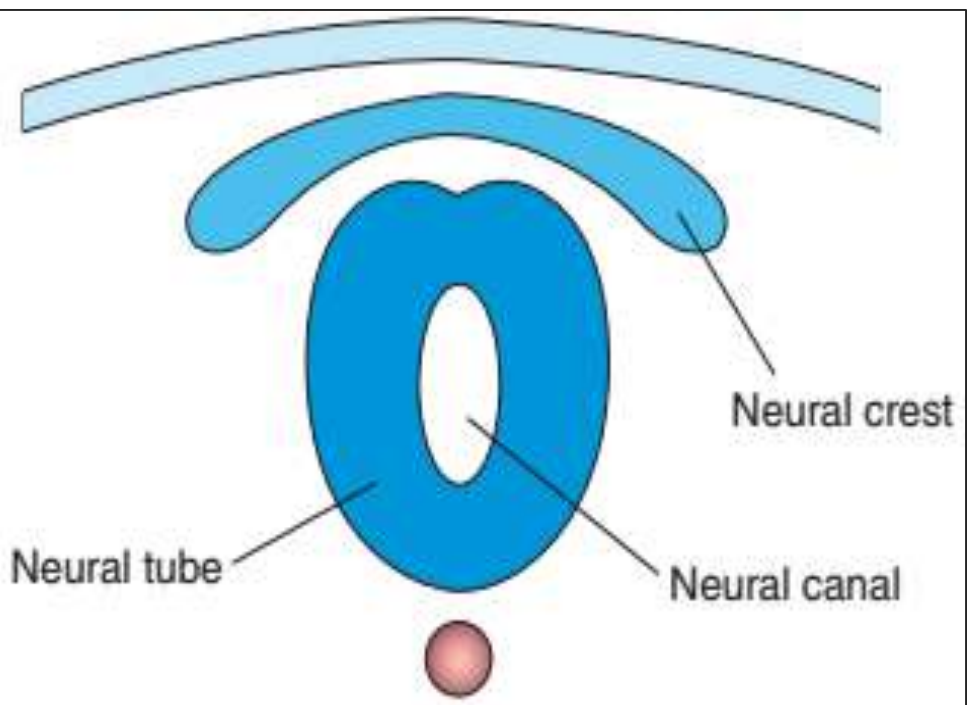
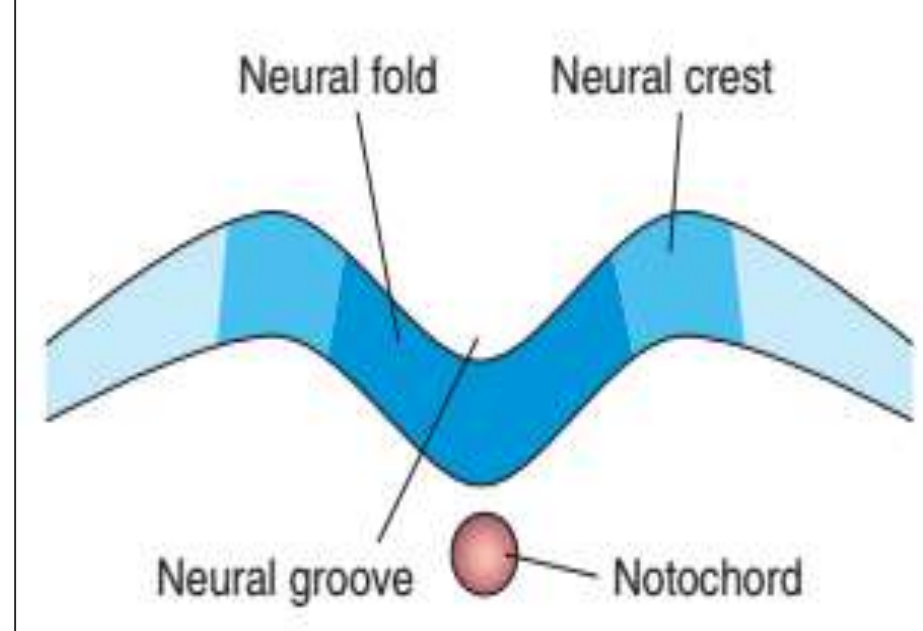
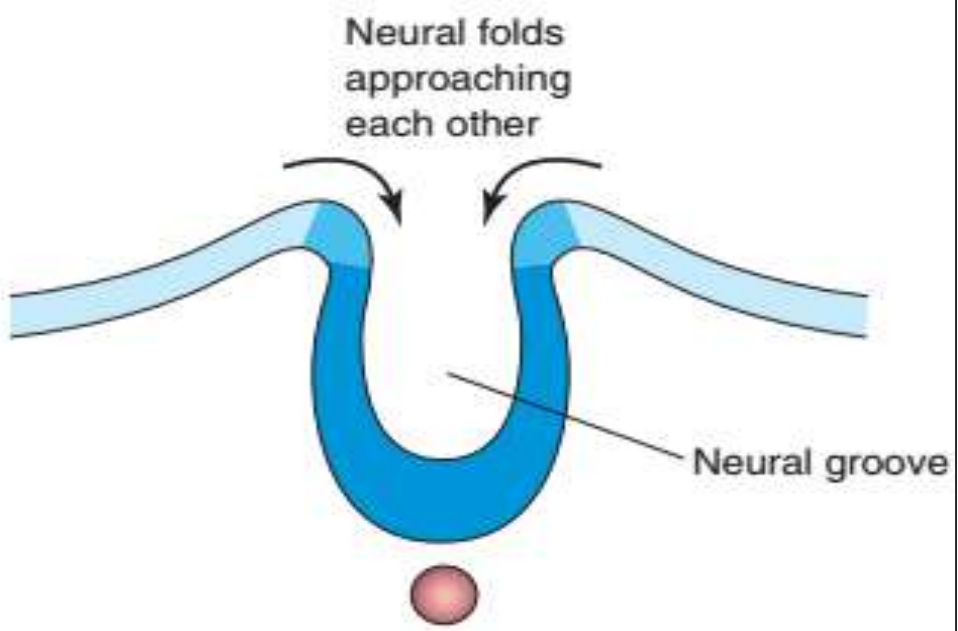
**Time:** At the 3rd week.

### Stages:

1. On 17th day, the ectoderm over the notochord forms an elongated thick plate called neural plate.
2. On 18th day, the neural plate invaginates to form neural groove.
3. The neural groove has neural folds on each side.
4. The neural folds approximate to each other and fuse to form the neural tube.
5. The neural tube then separates from the surface ectoderm.
6. During the separation of the neural tube some cells fall on both sides of it to form the neural crest cells.
7. The cranial end of the tube dilates to form the brain vesicle & the remaining part forms the spinal cord.

يُلي بدنا اياه هو انا لما ظهر عندي notochord رح  
يخلي ectoderm يلي على السطح يعمل groove  
بعدين رح تقرب من بعضها و نلاقي انه الـ  
ectoderm بسكّر عليهم، بعدين بتكوّن neural  
tube و فوقها طبقة من الخلايا اسمها neural  
crest cells

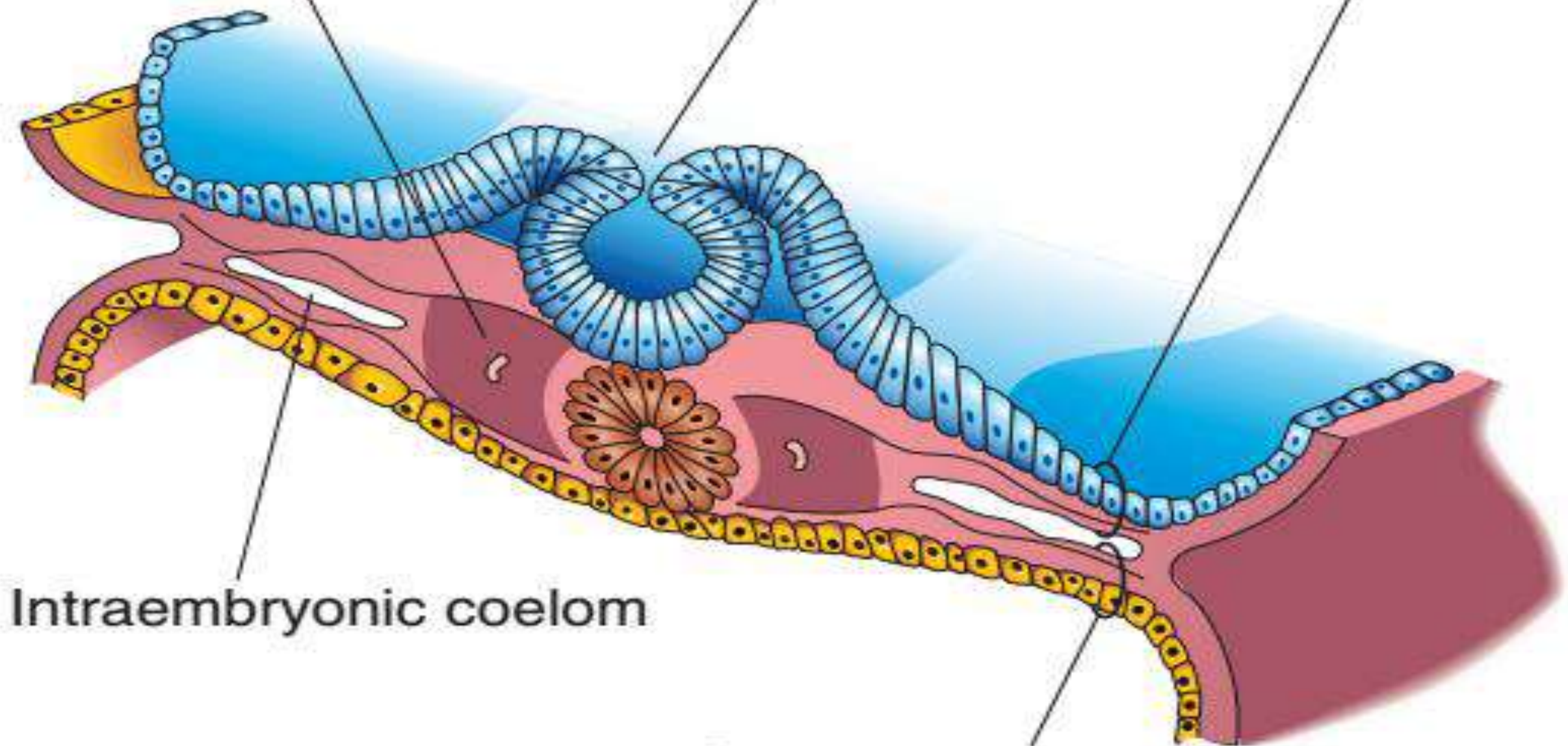




Somite

Neural folds about to fuse to form neural tube

Somatopleure



Intraembryonic coelom

Splanchnopleure

## 3<sup>RD</sup> WEEK OF PREGNANCY

### Neural crest

**Origin:** Group of cells that fall on both sides of neural tube.

ماشرح ايشي صرون بس طلب  
حفظه تامل.

### Derivatives:

**a. Neuroblasts:** these cells give rise to:

1. Nerve cells of dorsal root ganglia.
2. Nerve cells of sympathetic ganglia.
3. Nerve cells of parasympathetic ganglia of some cranial nerve (3rd, 7th, 9th & 10th).
4. Nerve cells of sensory ganglia of some cranial nerve (5th, 7th, 8th & 10th).

**b. Spongioblasts:** these cells give rise to:

1. Pia and arachnoid maters.
2. Schwann cells.

**c. Chromaffin cells:** these cells give rise to:

1. Suprarenal medulla.
2. Cells of carotid and aortic bodies.

**d. Melanocytes:** Pigment cells of the skin.

**e. Some bones of the face.**

## Intra-embryonic mesoderm

- It is continuous with **extra-embryonic mesoderm** covering amnion and yolk sac at the margin of embryonic disc.
- By the middle of 3rd week, I.E.M. separate the ectoderm and endoderm every **where EXCEPT:** ہیون بطن میں ما عدا ہر جگہ

Cranially: **at prochordal plate.**

In the median plane: **at notochordal process**

Caudally: **at cloacal membrane.**

- Development: A longitudinal groove appears on each side of the notochord dividing the intra embryonic mesoderm into: (groove)

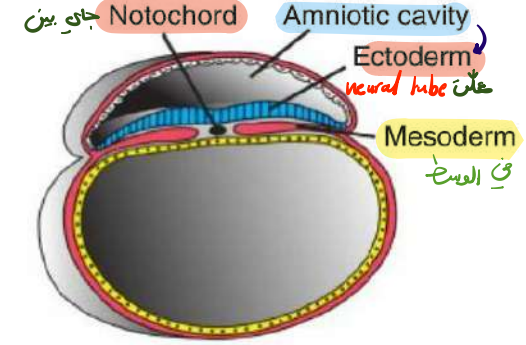
1- **paraxial mesoderm:** on each side of notochord.

2- **Intermediate cell mass:** in the floor of the groove.

3- **Lateral plate mesoderm:** Lateral to the groove.

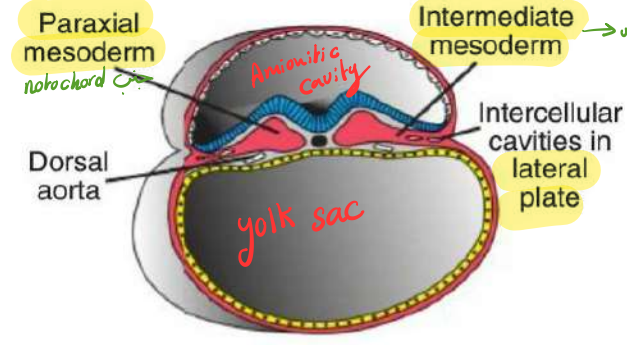
→ somatic layer  
splanchnic layer

endo + ecto جاي بين

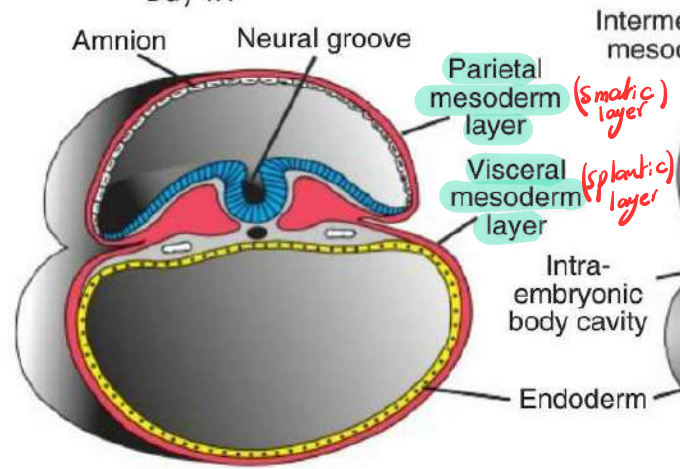


Day 17.

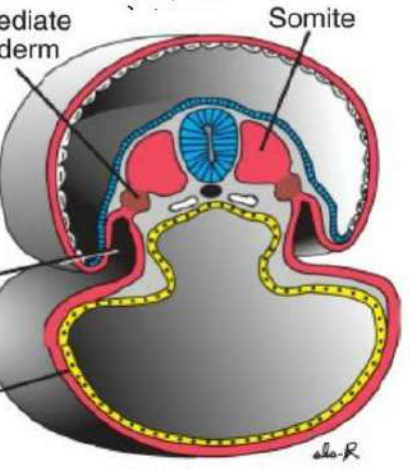
شوي جاي بالضره



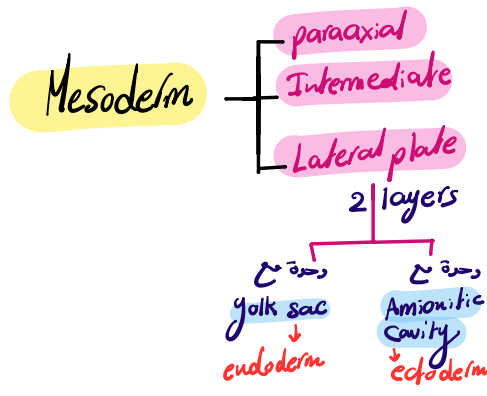
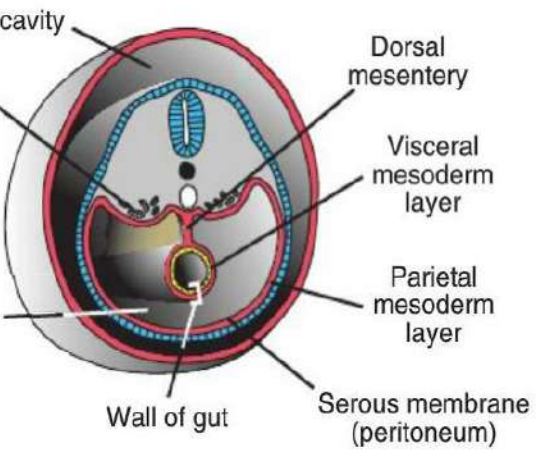
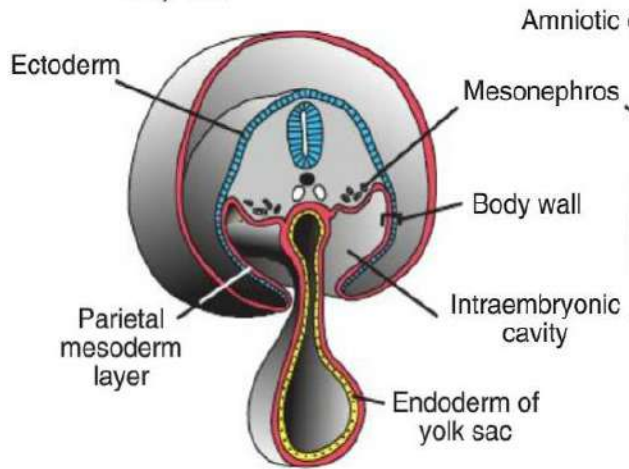
Day 19.



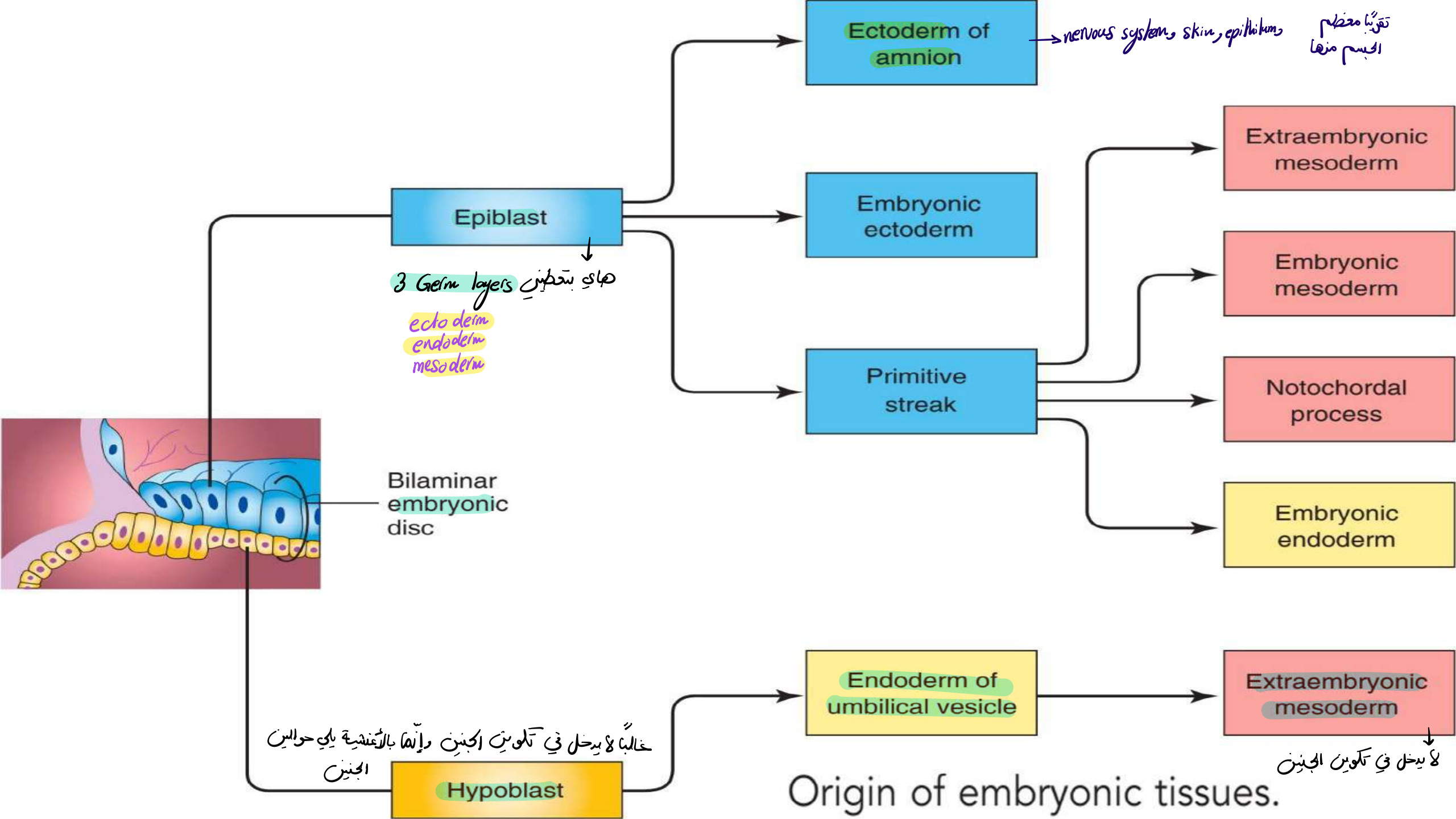
Day 20.



Day 21.



Transverse sections showing development of the mesodermal germ layer.



urinary tract

GIT

# أي جيون في الجسم إليه بطانة مثل

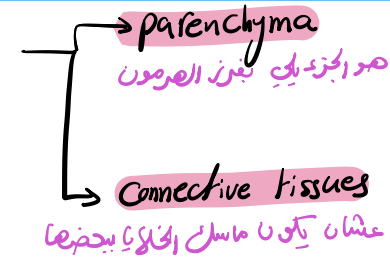
وهي البطانة يتطوع من ectoderm

# Differentiation Of Three Germ Layers

## 1) Derivatives of Ectoderm

- 1- Central and peripheral nervous system. CNS + PNS
- 2- Sensory epithelium of the eye, ear and nose.
- 3- Epidermis of the skin and it is appendage (hair, nails and the sweat, sebaceous and mammary glands). → Breast من الطبقة الخارجية
- 4- The pia and arachnoid mater.
- 5- Suprarenal medulla and chromaffin tissue.
- 6- The external auditory meatus and the outer layer of tympanic membrane.
- 7- Enamel of teeth.
- 8- The epithelium of nasal cavity and the paranasal sinuses.
- 9- The anterior part of the buccal cavity, gums, salivary glands, pituitary glands, lower half of anal canal and the terminal part of male urethra.
- 10- The conjunctiva, outer layer of cornea and muscle of the iris.

# Any gland consists of



## 2) Derivatives of endoderm

### 1- Epithelial lining of:

- a. Gastro-Intestinal Tract.
- b. Respiratory Tract.
- c. Urinary Bladder and urethra.
- d. Tympanic cavity, antrum and auditory tube in the ear.

2- Parenchyma of tonsil, thyroid, parathyroid glands, thymus, liver and pancreas.



## 3<sup>RD</sup> WEEK OF PREGNANCY

# كل جزء من meso derm بطبيعي استرخي

### 3) Derivatives of Intraembryonic mesoderm

A. Paraxial mesoderm: divides into Number: 42-44 pairs of somites

Fate: somites divided into two parts:

1. Ventromedial part: form Sclerotome which gives axial skeleton (vertebral column and ribs).

2. Dorsilateral part: form Dermo-myotome.

- Dermatome: superficial part and gives dermis of skin and fascia.
- Myotome: deep part and gives skeletal muscles.

skin muscle

inside تكون

epi dermis و تذكروا إنه  
ecto تان من

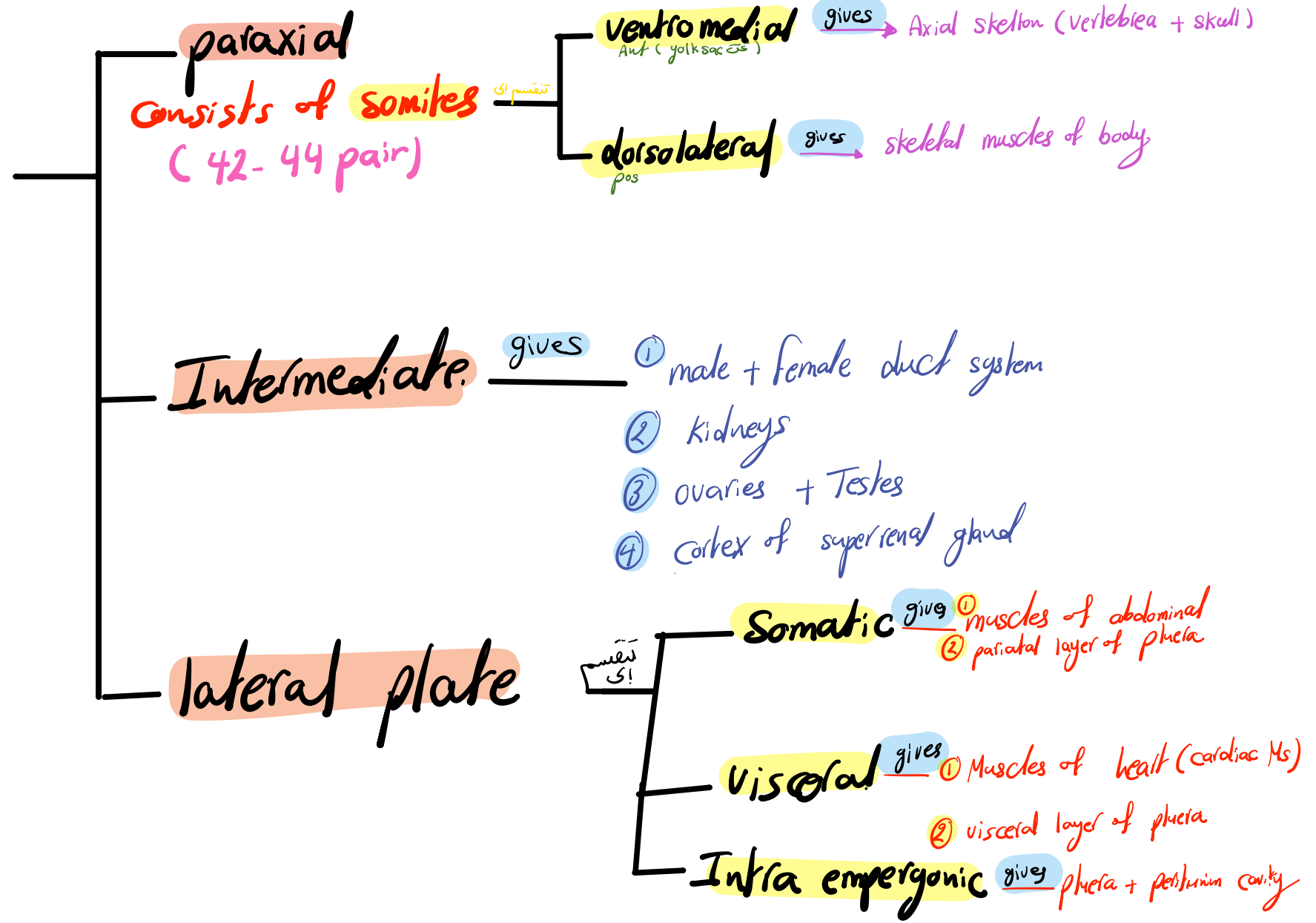
### B. Intermediate cell mass

Definition: part of intraembryonic mesoderm in floor of longitudinal groove.

Fate: gives urogenital system:

1. Male and female duct system
2. Kidney
3. Testis or ovary
4. Cortex of suprarenal gland.

# Mesoderm



## C. Lateral plate mesoderm

**Definition:** part of intraembryonic mesoderm lateral to longitudinal groove.

**Development:**

- Small cavities appear in lateral plate mesoderm.
- These cavities unite to form single horse shoe cavity (intraembryonic coelom) that divides lateral plate mesoderm into:
  1. Somatic (parietal) layer
  2. Visceral (splanchnic) layer
  3. Intraembryonic coelom

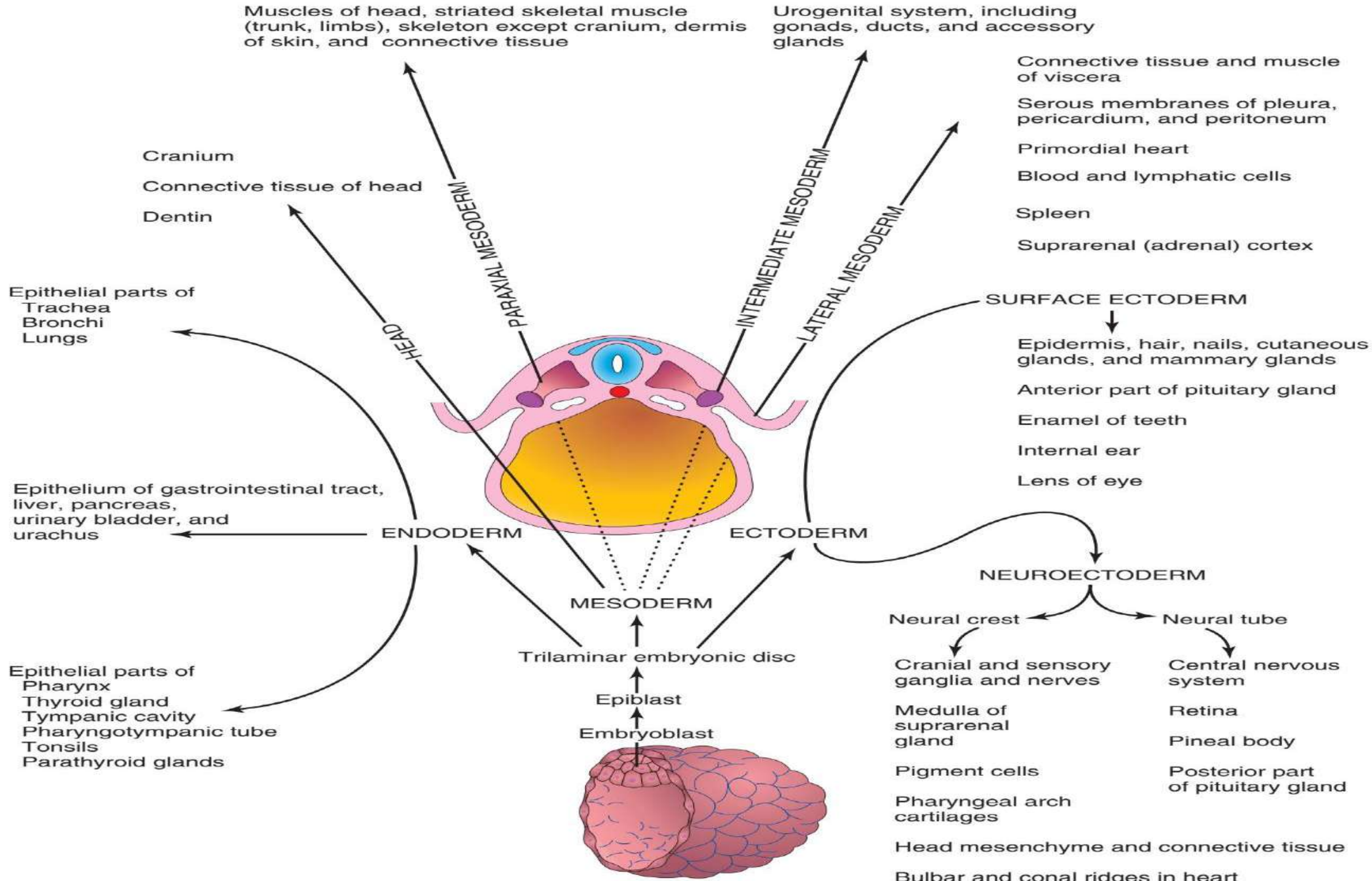
1. Somatic (parietal) layer: gives

- a) Muscles of abdominal wall and chest wall.
- b) Parietal layer of pleura, peritoneum and pericardium.

2. Visceral (splanchnic) layer: gives

- a) Muscles of heart, smooth muscles of bronchial tree and gut.
- b) Visceral layer of pleura, peritoneum and pericardium.

3. Intraembryonic coelom: divided into pleural, peritoneal and pericardial cavities.



شکرا

