

Normal Site of Implantation

upper part of the posterior wall of the body of the uterus

Abnormal sites of implantation :

A-Outside the uterus

☐ **Tubal pregnancy** : In the uterine tube

It usually ruptures within 1 – 2 months leading to internal hemorrhage.

☐ **Ovarian pregnancy** : In the ovary .

☐ **Abdominal pregnancy** : In the abdominal cavity close to the peritoneum or an omentum

Abnormal sites of implantation :

B-Inside the uterus (placenta previa):

-Implantation occurs in the lower segment of the uterus, it called the placenta previa may be one of three types:

1-Placenta previa Partialis :The margin of placenta does not reach the internal os.

2-Placenta previa marginalis :The margin of the placenta reaches the internal os.

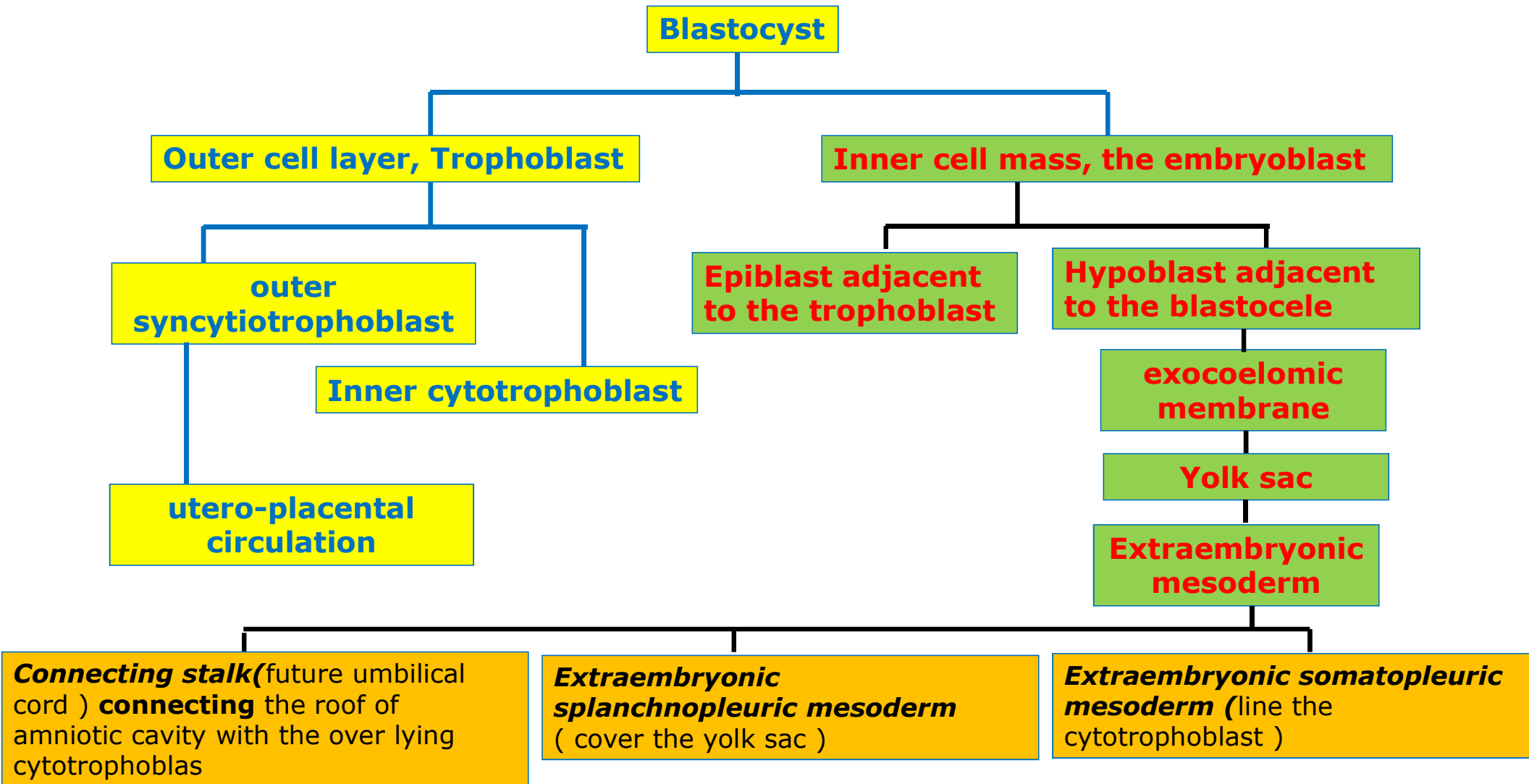
3-Placenta previa centralis :The placenta overlies internal os. It Is the most dangerous type.

The Placenta previa is life threading so caesarean section is recommended as :-

- It leads to antepartum(before delivery) maternal hemorrhage
- It may leads to fetal death

1.Changes in the embryoblast :

- Formation of the **bilaminar germ disc** :
- Epiblast*** adjacent to the trophoblast in floor of the amniotic cavity
- Hypoblast*** adjacent to the blastocele.
- The germ disc is **rounded or oval** in shape .



Types of Chorionic Villi

A. Primary chorionic villi

- Consists of a cytotrophoblastic core covered by a syncytiotrophoblast layer.
- They are separated by lacunae filled with maternal blood.

B. Secondary chorionic villi:

- During middle of the 3rd week, extraembryonic mesoderm invades the cores of the primary villi
- 2ry villus is formed of a core of mesoderm covered by cytotrophoblast then syncytiotrophoblast.

C. Tertiary chorionic villi:

- By end of the 3rd week of development, the mesodermal cells in the cores of the 2nd villi begin to differentiate into blood vessels.
- They are separated by intervillous spaces filled with maternal blood.

Parts of tertiary villi

- **Stem villi** are those attached to the chorionic plate .
- **Anchoring villi** are those which extend to the ***decidua basalis*** (endometrium forming the maternal part of the placenta) to fix the chorionic vesicle to the uterine wall .
- **Free, floating or absorbing villi :**

Those are the side branches from the stem villi and float freely within maternal blood in the intervillous spaces .

At these villi exchange of nutrients and other factors will occur.

Parts of chorion

➤ **Chorion frondosum**

The villi adjacent to decidua basalis (of endometrium) enlarge and form chorion frondosum, which will form the fetal part of the placenta.

➤ **Chorion leave**

The villi adjacent to decidua capsularis (of endometrium) will form the chorion leave ,which will atrophy .

Gastrulation

It is the process of transformation of the **bilaminar embryonic disc** to form a **trilaminar germ disc**

2. Invagination :

The cells of epiblast migrates towards the primitive streak ,slip beneath it into the interior of the embryonic disc to :

- a) Invade and replaces the hypoblast to form the **endoderm**.
- b) The remaining part of the epiblast forms the **ectoderm**
- c) Some of the invaginated epiblast cells remain and migrate in all directions in between the ectoderm and the endoderm to form **intra-embryonic mesoderm** .

Definitive notochord is a solid cord of cells **extending** from the primitive pit to the **Prochordal plate** and buccopharyngeal membrane.

Significance of notochord :

It acts as **temporary axial skeleton** for the embryo being **replaced later** on by the vertebral column which is the permanent axial skeleton

Three Germ Layers

Ectoderm

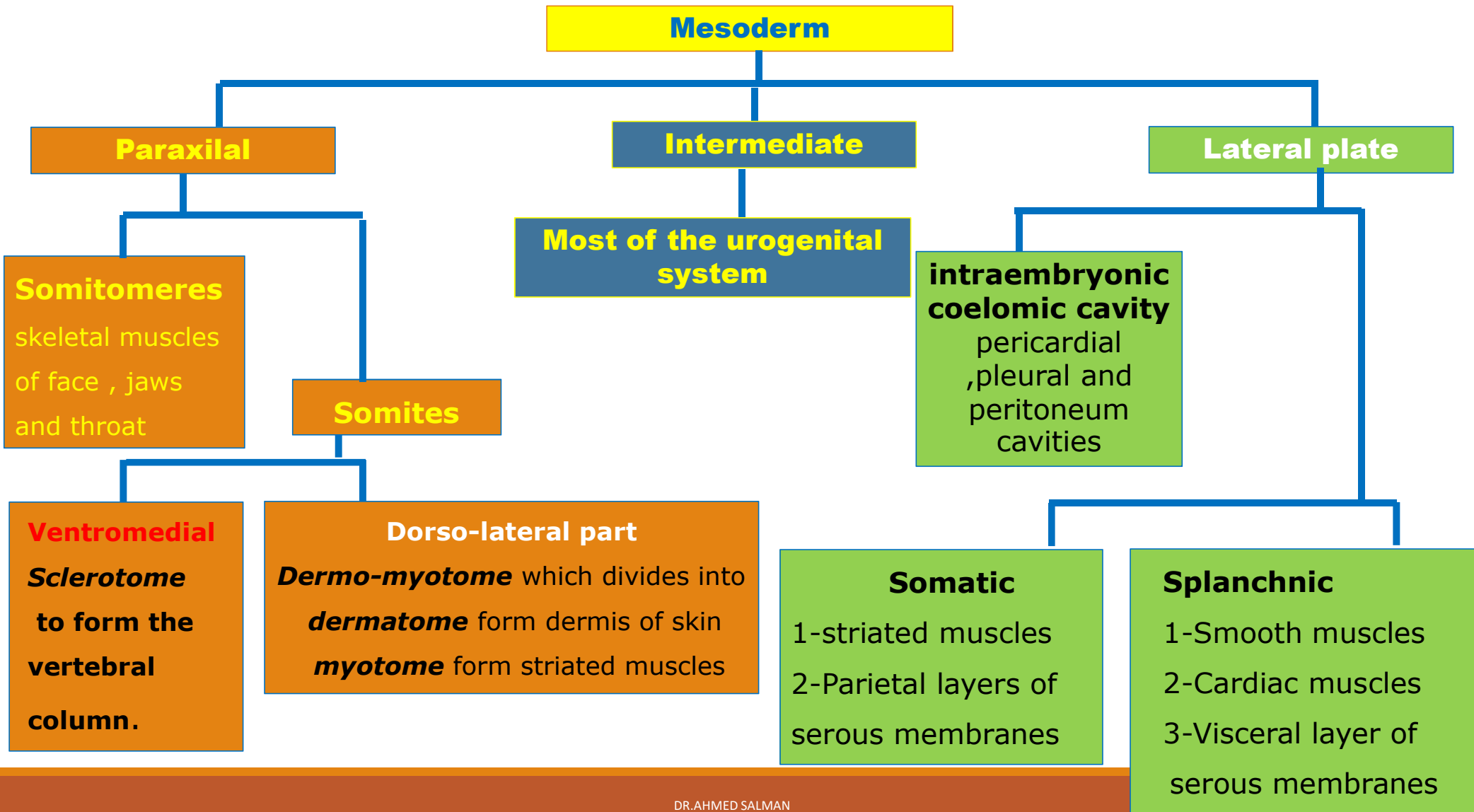
- 1-The epidermis of the skin
2. Nervous system :
 - **The neural tube** gives brain , spinal cord
 - Peripheral nerves.
 - **Sensory** epithelium of sensory organs
3. External auditory meatus & outer layer of ear drum .
4. Nasal epithelium
5. Anterior part of oral cavity and lower ½ of anal canal .

Neural crest

- 1.Ganglia
- 2.Cells : Glial and melanocyte cells
- 3.Adrenal medulla
- 4.Septum between ascending aorta & pulmonary trunk

Endoderm

- 1- Epithelium lining of
 - A. Most of GIT
 - B. Most of urinary bladder and urethra
 - C. Middle ear and Eustachian tube
- 2-Parenchyma of Palatine tonsils, thyroid, Liver & pancreas



Folding

- ★ At the **end of 3rd. week** , the flat embryonic disc starts to **fold** and **bulges** into the amniotic cavity .

Two types of folding:

- The embryonic disc becomes folded in 2 directions simultaneously

1-Cephalo-caudal folding :

- It leads to formation of **head and tail folds** .

2- Lateral folding :

- It leads to formation of **lateral folds** .

Causes of folding :

1. Rapid growth of the **central nervous** system and **somites**.

2. Progressive expansion of the **amniotic cavity** .

Results of folding:

- 1-The flat shaped **embryonic disc** changes to the ***cylindrical*** appearance with formation of **body cavity**.
- 2- The **amniotic cavity** surrounds the embryo almost completely .
- 3-The **amnio-ectodermal junction** shifts to the ventral aspect of the body to form the **primitive umbilical ring**
- 4-The **connecting stalk** and **allantois** shift to the ventral side of the body with the connecting stalk into the **primitive umbilical ring**
- 5- A large part of the cavity of the **yolk sac** is incorporated into the body of the embryo forming the **primitive gut** which is lined by endoderm.

6-The part of the gut found in the **head fold** is called the **foregut**, the part found in the **tail fold** is called the **hind gut**, whereas the part in between within the **lateral folds** is called the **midgut** .

7- The **buccopharyngeal membrane** becomes the **cephalic**, and the **septum transversum** becomes the **caudal** to pericardial cavity , while the pericardial cavity and heart remain in between.

8-The **cranial end** of the folded embryonic disc shows the followings :

- a) **Forebrain swelling** produced by the developing forebrain .
- b) **pericardial swelling** produced by the developing heart .
- c) Depression between the previous 2 swellings called **stomatodeum** .