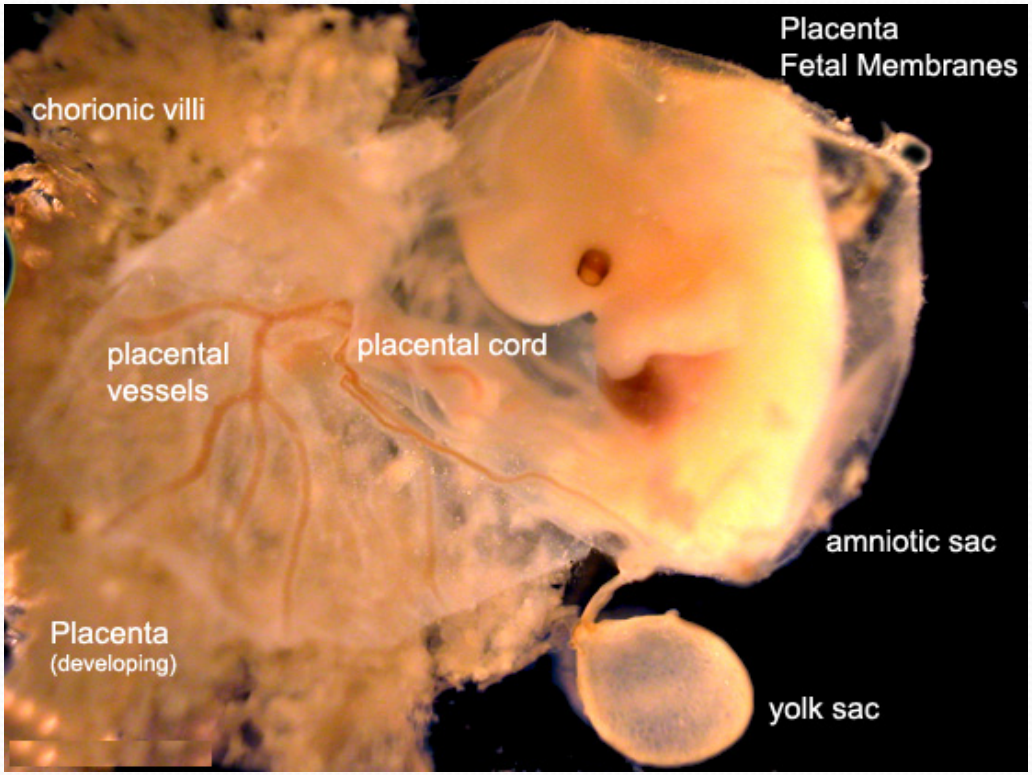
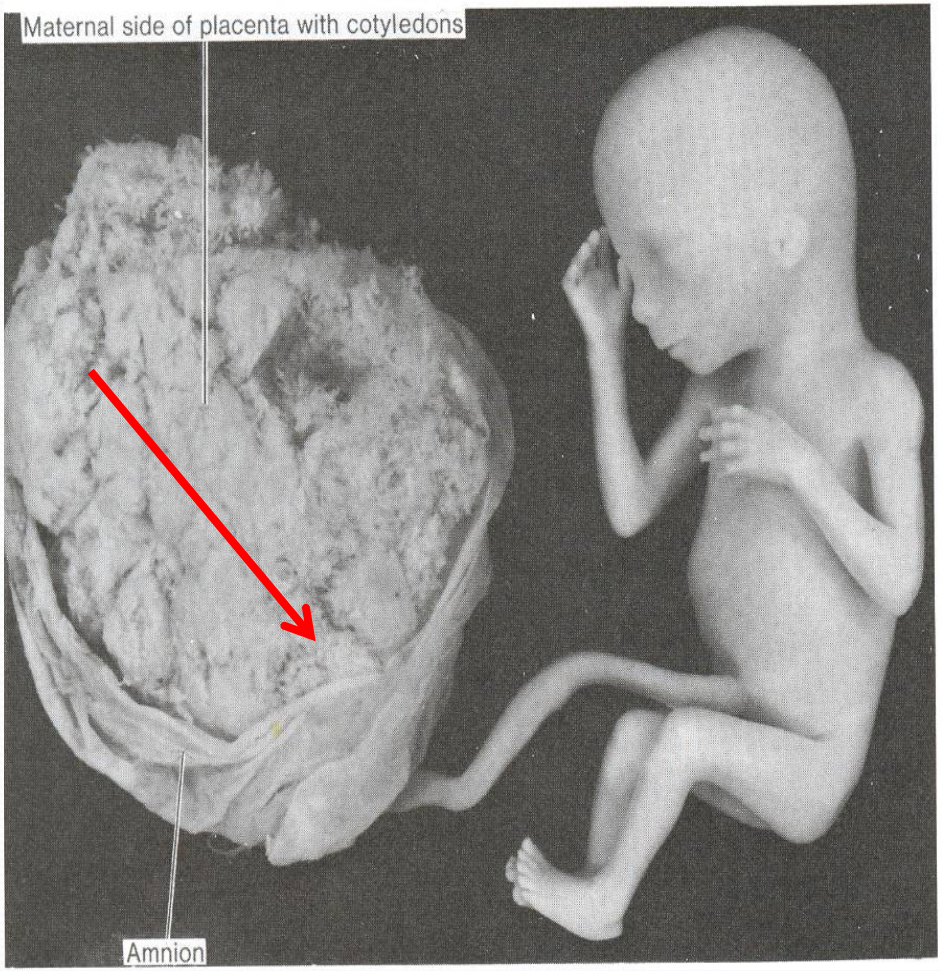
PLACENTA

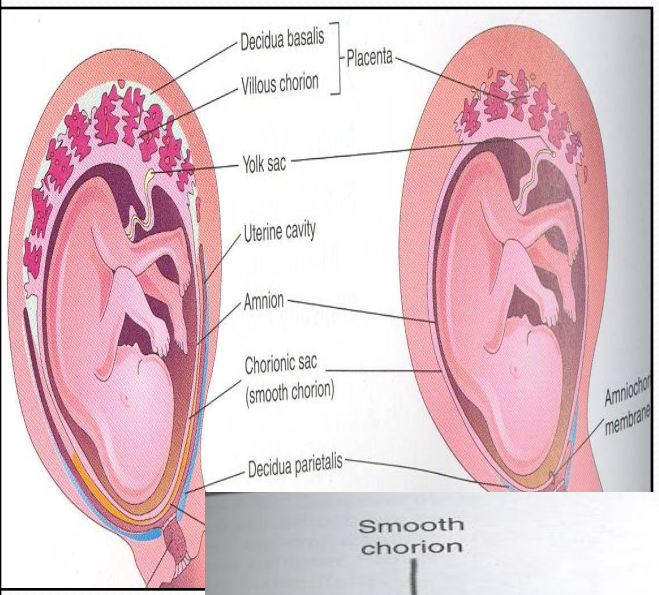
Dr Jamila ELmedany

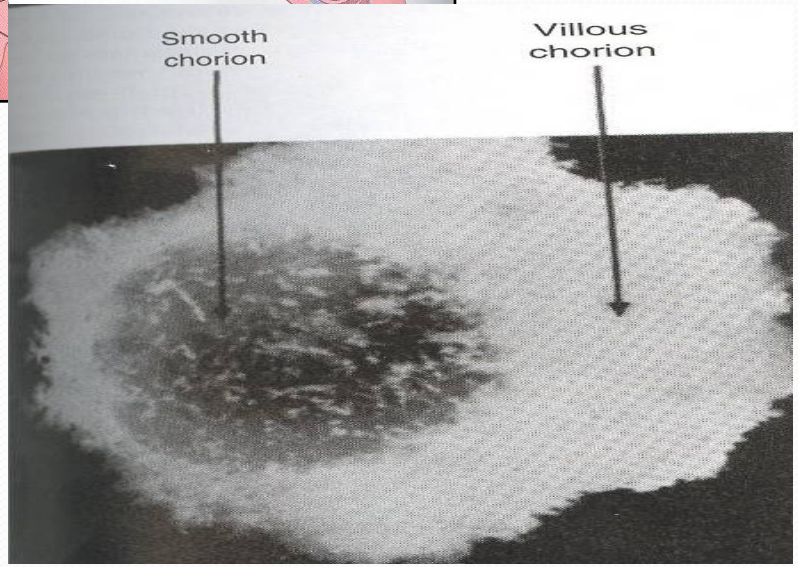




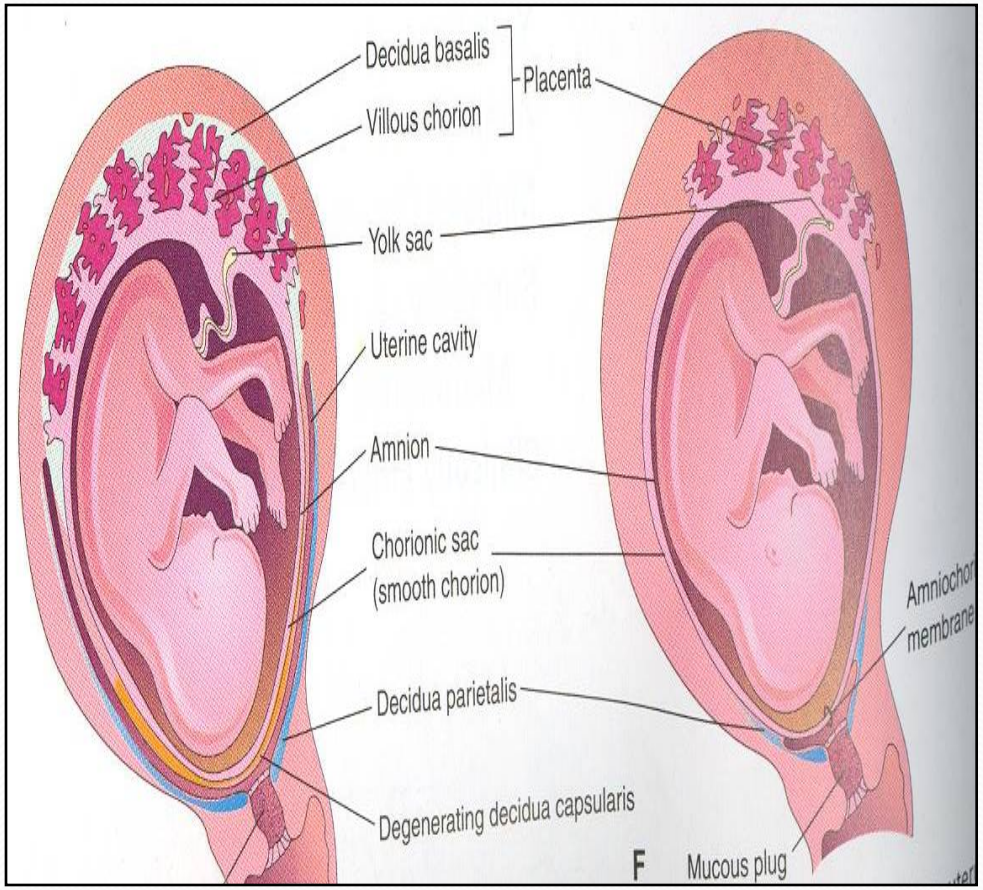
- **It is a Fetomaternal structure**.
- Formed by the beginning of the **4th month.**
- It is the primary site for exchange of gases and nutrients between the mother and the fetus.

Formation of Placenta





- **Fetal Part:**
- **Villous Chorion.**
- It is the bushy area at the embryonic pole
- Its villi are more in number, enlarged and branch profusely.
- **Maternal Part:**
- **Decidua Basalis (**part of the decidua deep to the conceptus.



- **Decidua (Gravid Endometrium) :**
- It is **the functional layer of the endometrium during pregnancy which is shed after parturition.**

FULL TERM PLACENTA

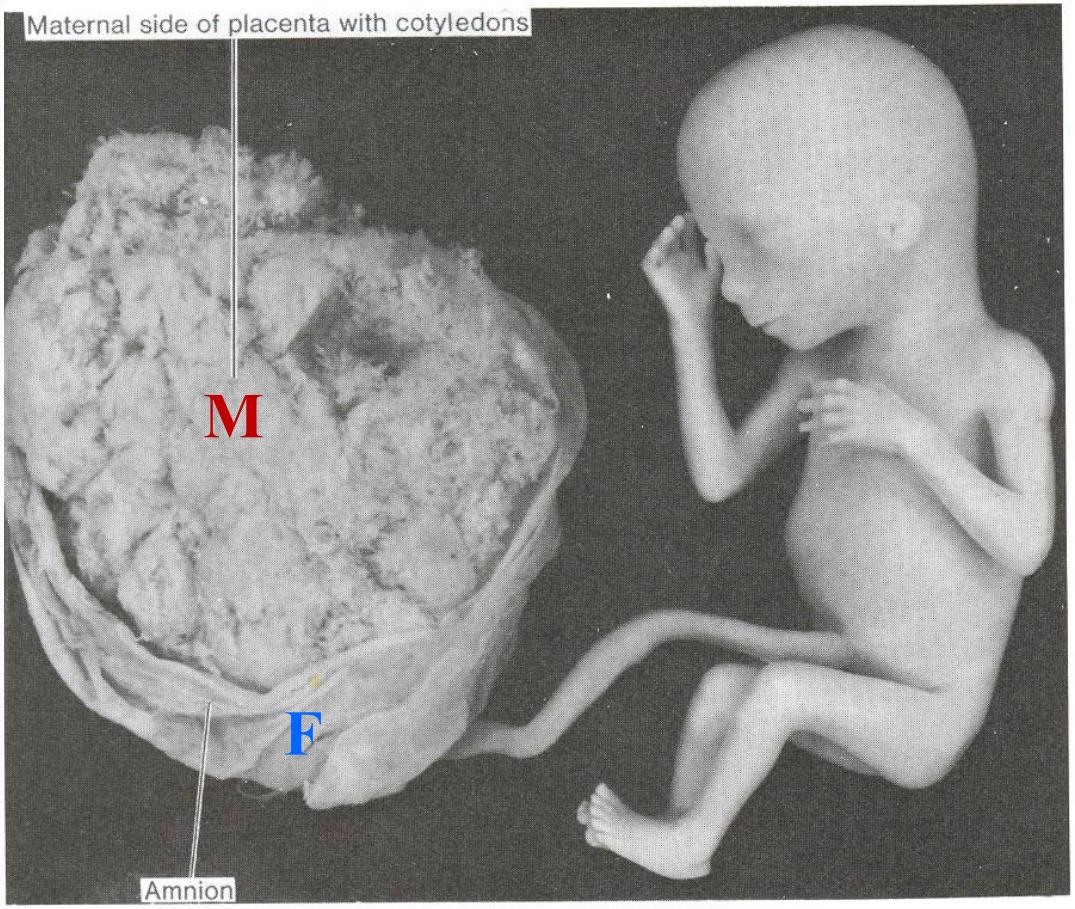
Discoid in shape.

Weighs (500 – 600)g.

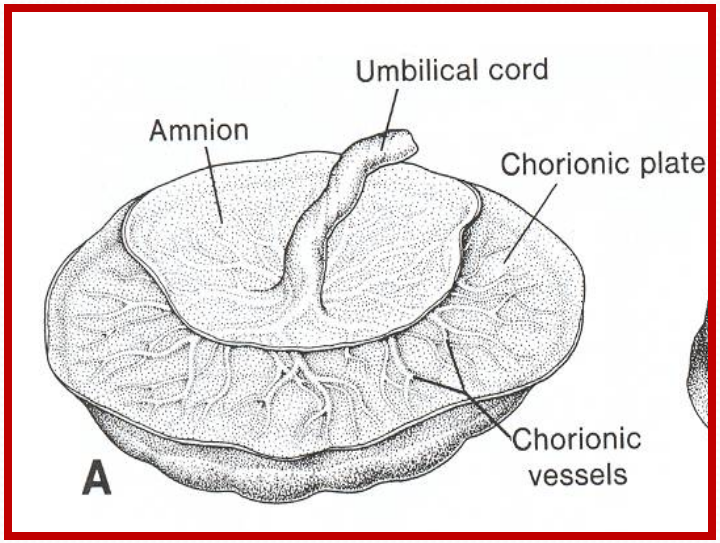
Has two surfaces:

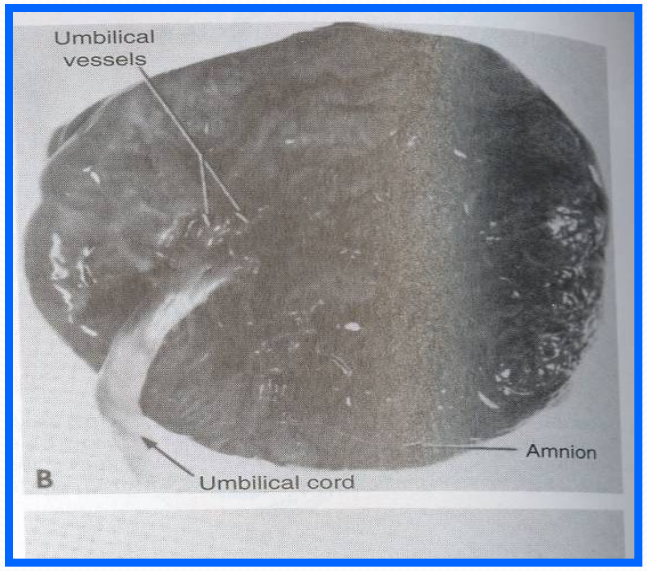
Fetal

Maternal



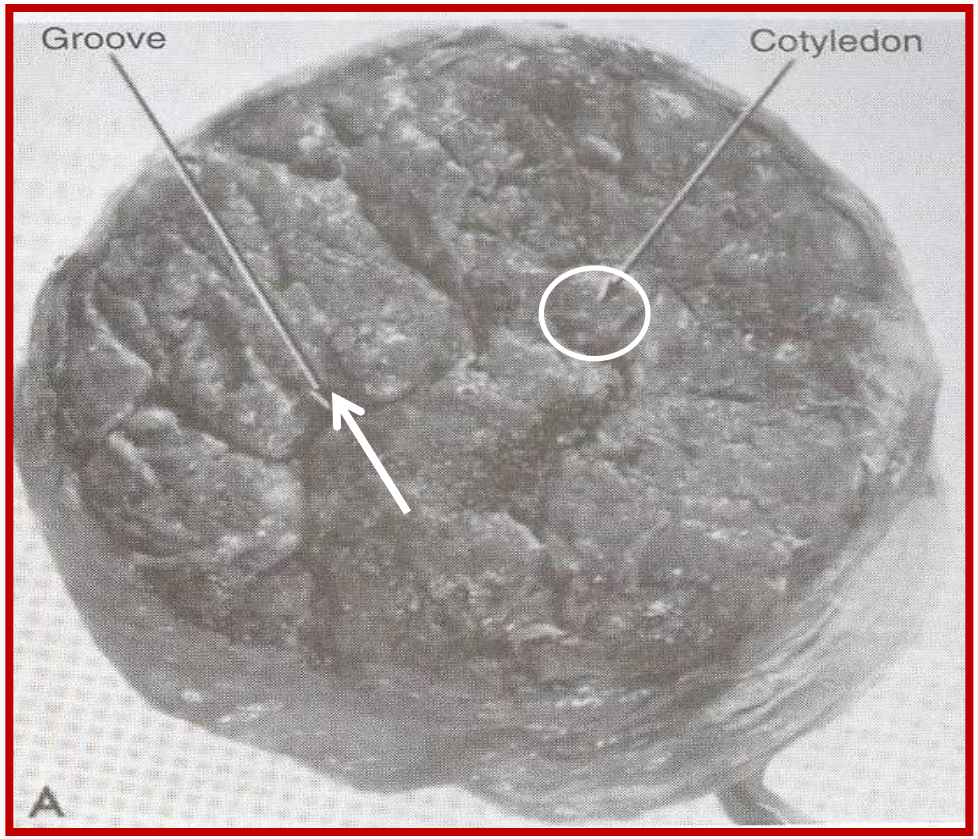
Fetal Surface





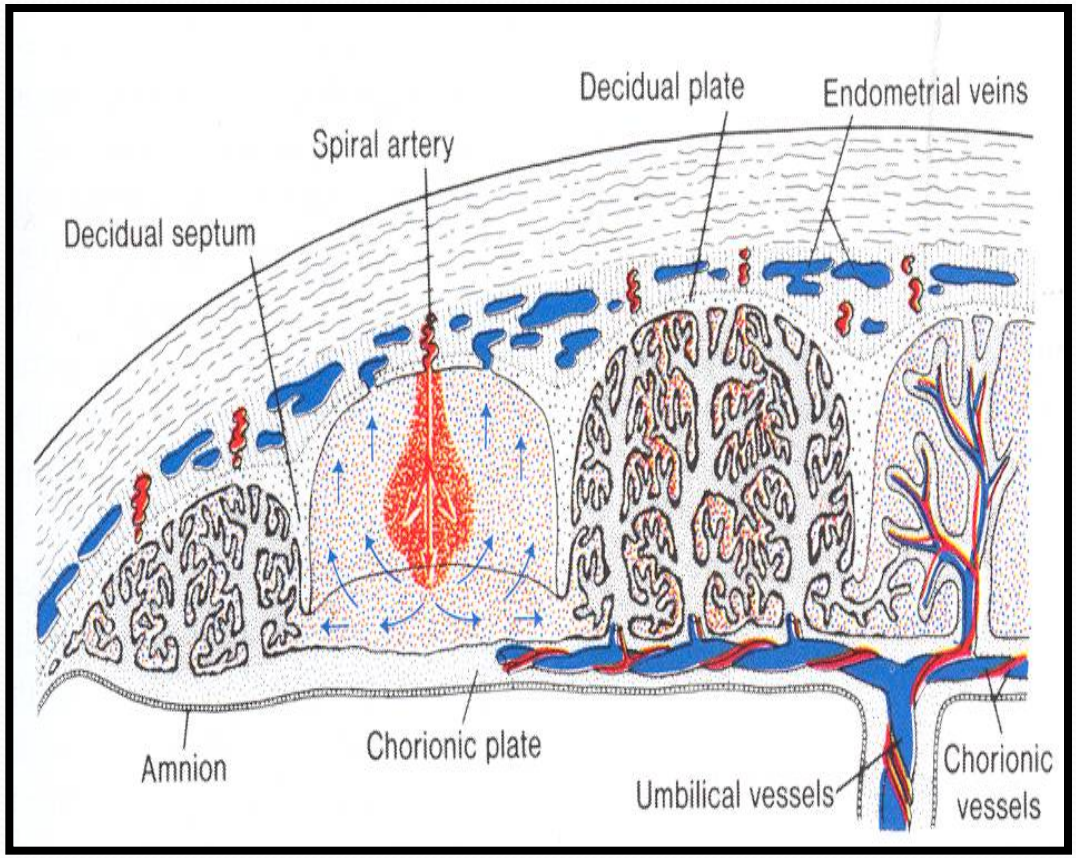
- **1. Smooth because it is covered with the amnion.**
- **2. The umbilical cord is attached to its center.**
- **3. The chorionic vessels are radiating from the umbilical cord.**

Maternal Surface



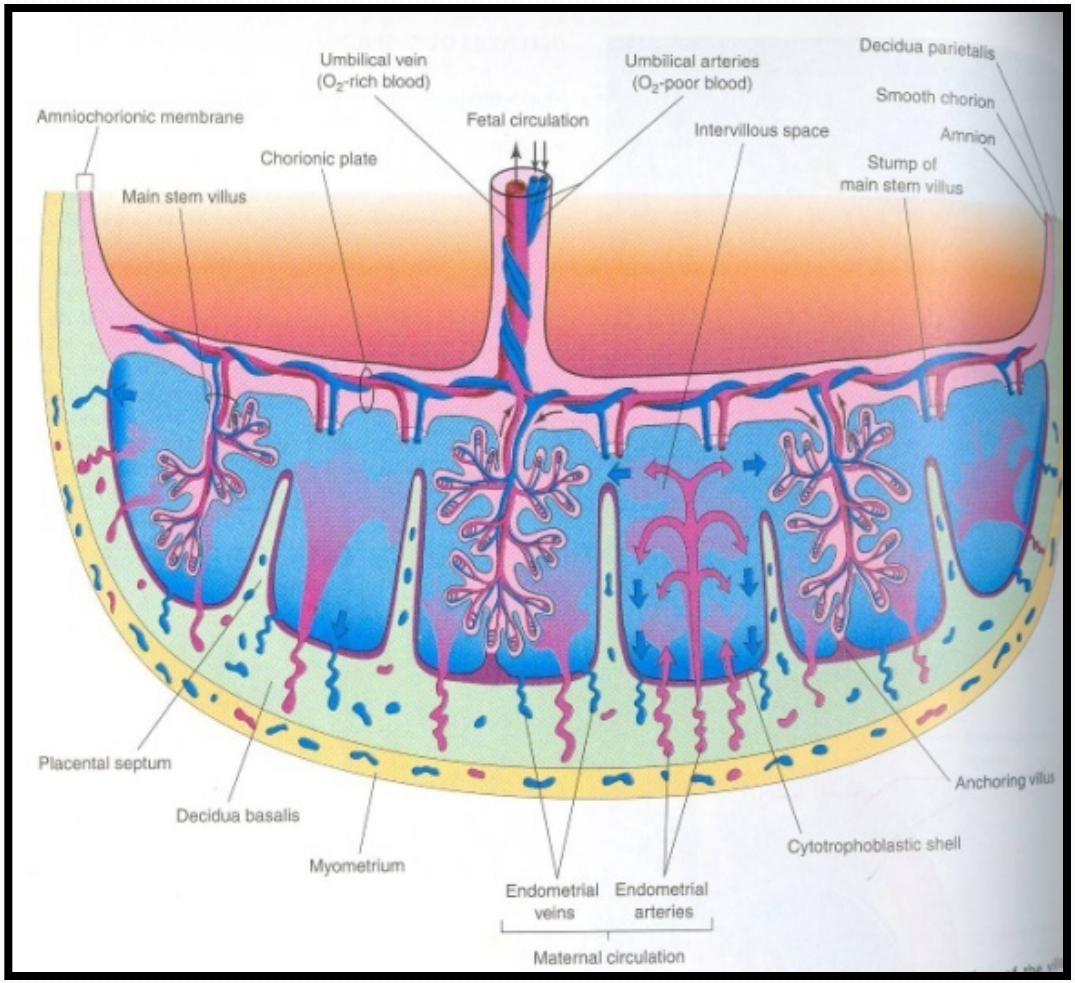
- **Rough.**
- Formed of (15 –20) irregular convex areas **(Cotyledons)**
- which are separated by grooves (**placental septa**).
- Each cotyledon is covered by a thin layer of **decidua basalis.**

Structure of a Cotyledon



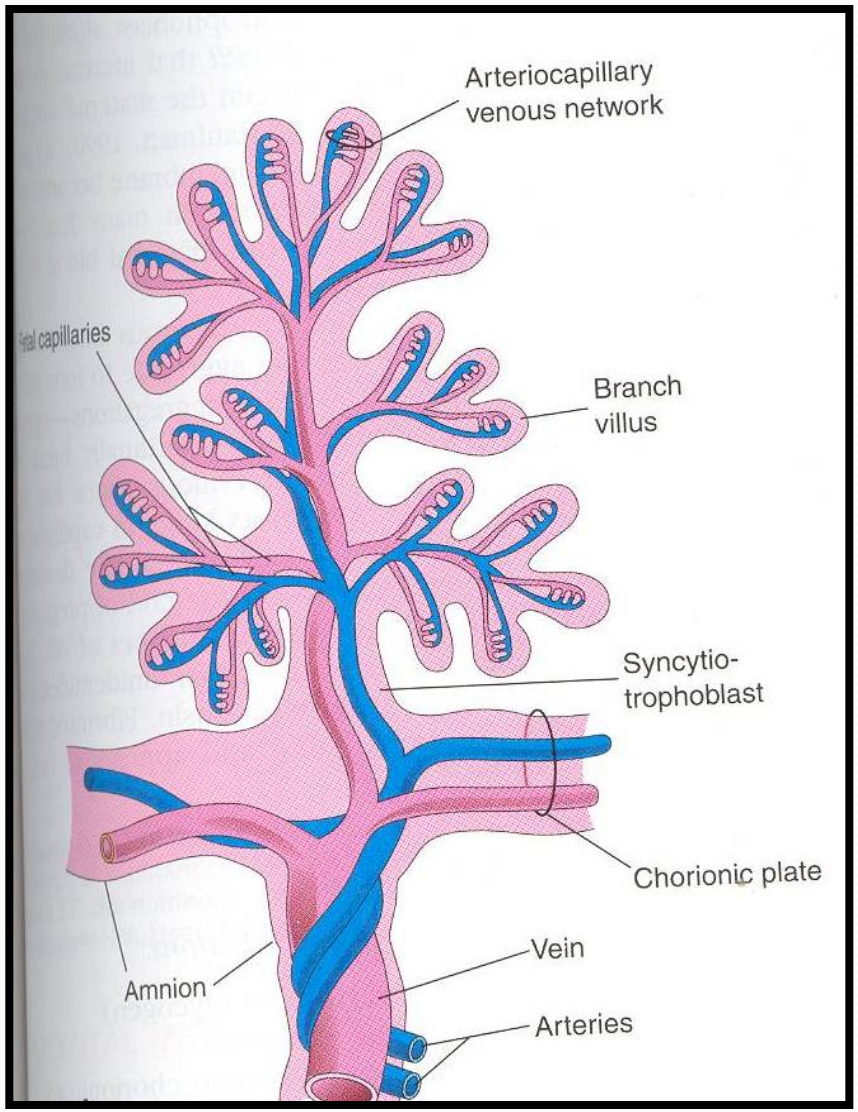
- It consists of two or more stem villi with their many branch villi.
- It receives (80-100) maternal spiral arteries that enter the intervillous spaces at regular intervals.

INTERVILLOUS SPACE



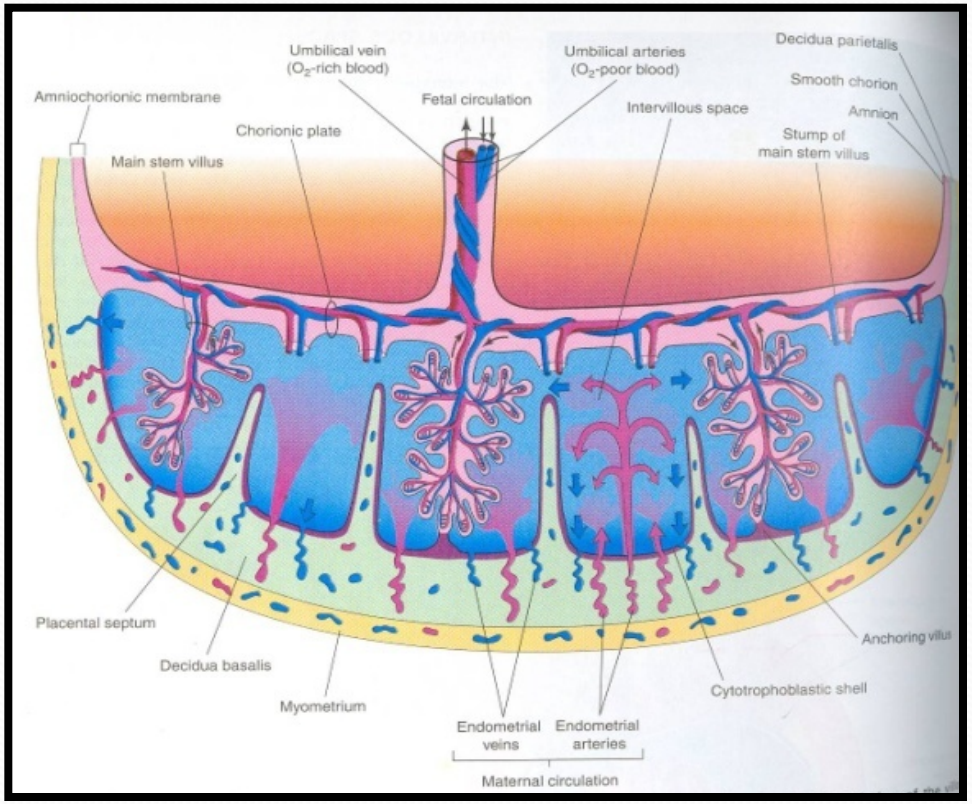
- large blood filled spaces which are freely communicating
- They receive spiral arteries from the lacunae in the syncytiotrophoblast.
- The spaces are drained through endometrial veins.
- Both arteries and veins pass through pores in the cytotrophoblastic shell.

Fetal Placental Circulation

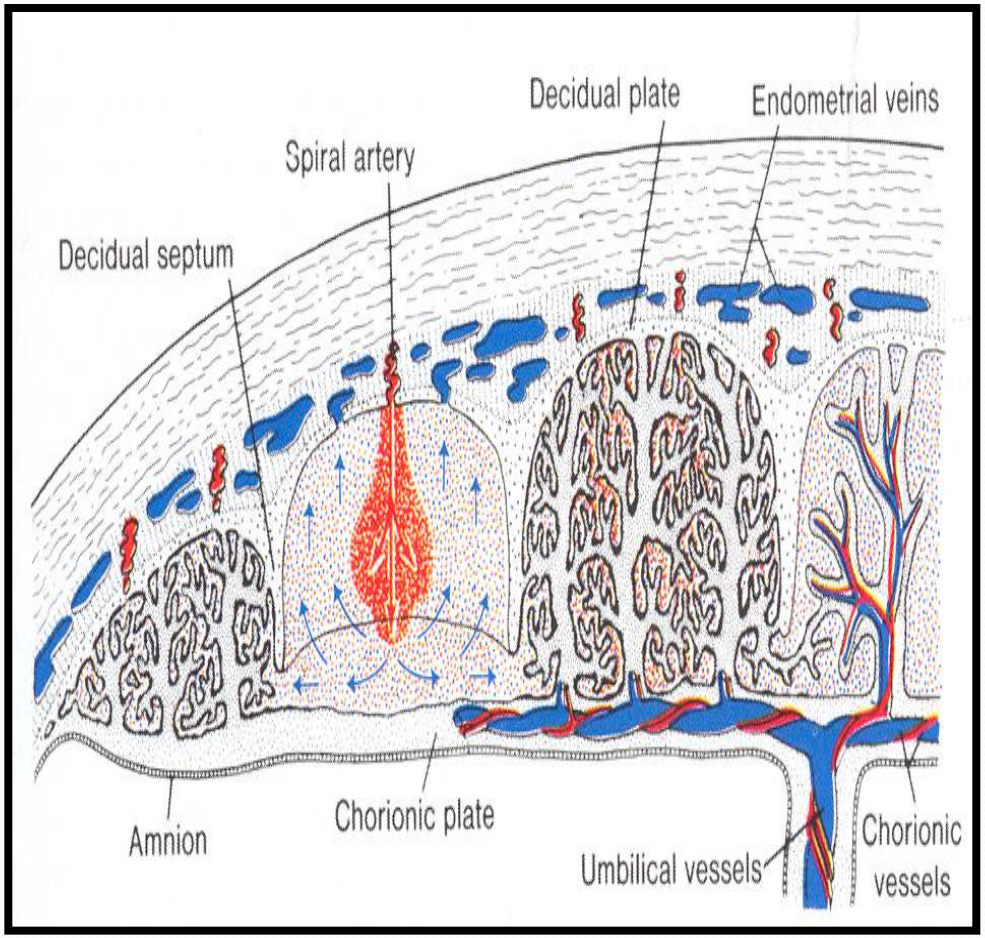


- **Two Umbilical Arteries:**
- Carry poorly oxygenated blood from the fetus to the placenta.
- within the branch chorionic villi, they form:
- **Arterio-capillary venous network:**
- It brings the fetal blood extremely close to the maternal blood.
- The well oxygenated fetal blood in the capillaries passes into veins accompanying the chorionic arteries.
- At the umbilical cord, they form the **One Umbilical Vein.**

Maternal Placental Circulation

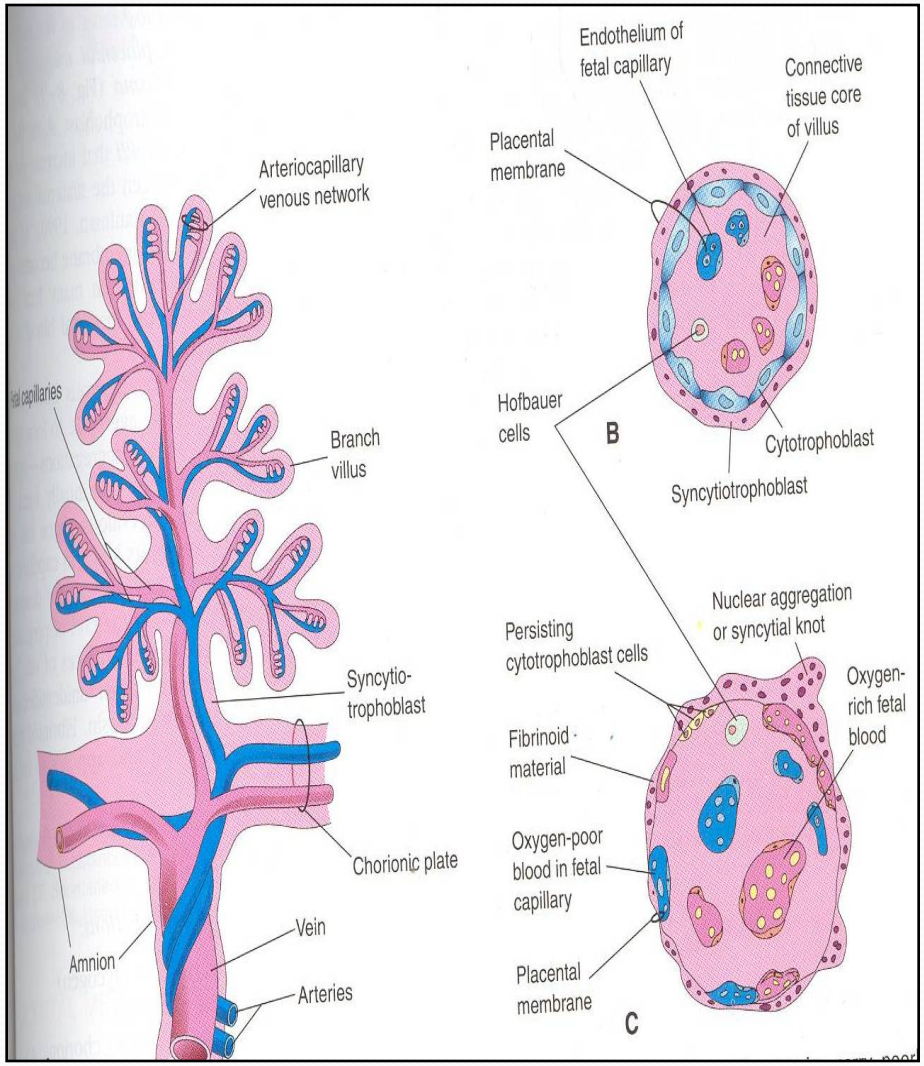


- **80 –100 spiral endometrial arteries** discharge into the intervillous space.
- The blood is propelled in jet like fountains by the maternal blood pressure.
- The pressure of this entering blood is higher than that in the intervillous space.
- It forms a roof of the space.
- As the pressure dissipates, the blood flows slowly around the branch villi.



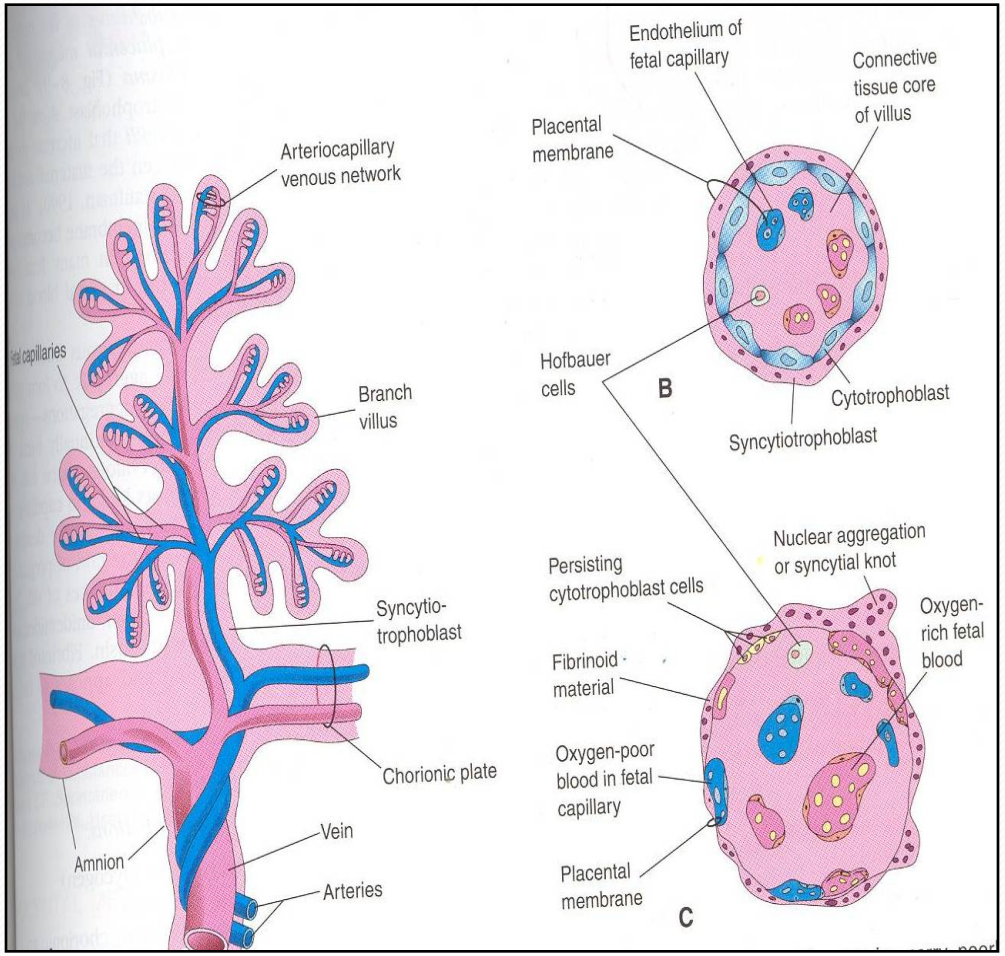
- Exchange of metabolites and gases with the fetal blood.
- As the pressure decreases, the blood flows back from the chorionic plate and enter the **endometrial veins** to the maternal circulation.

PLACENTAL MEMBRANE



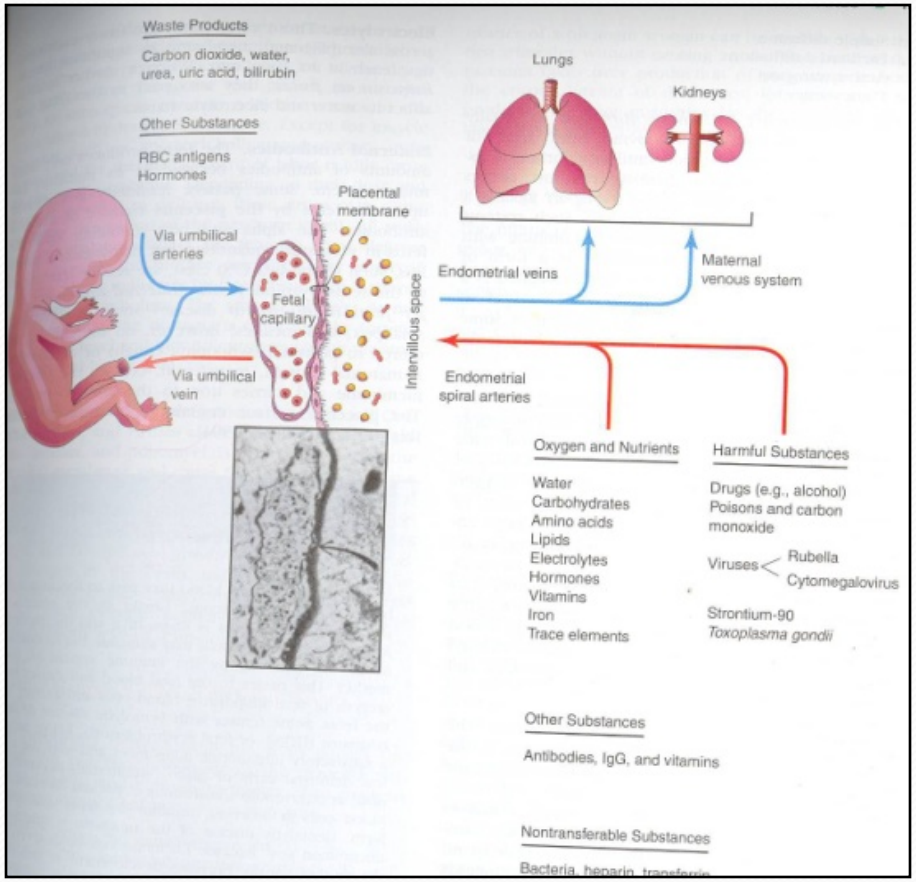
- It is a composite thin membrane of extra fetal tissues which **separates** the fetal and maternal bloods.
- **Up to (20) weeks, it is composed of (4) layers:**
- **Syncytiotrophoblast.**
- **Cytotrophoblast.**
- **Connective tissue of the villus.**
- **Endothelium of fetal capillaries.**

PLACENTAL MEMBRANE

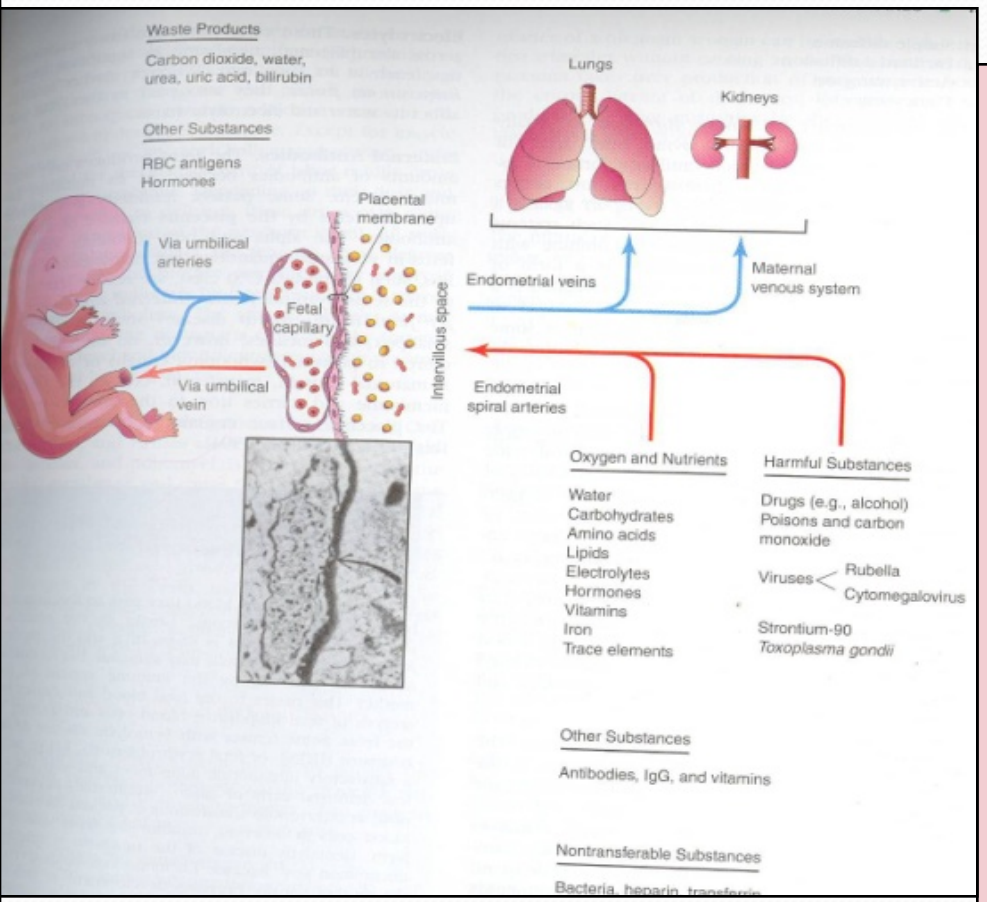


- **At full term**
- **It becomes thinner and composed of (3) layers only:**
- **1. Syncytiotrohoblast.**
- **2. Connective tissue.**
- **3. Endothelium of the capillaries.**
- At some sites, the syncytio comes in direct contact with the endothelium of the capillaries and forms **Vasculosyncytial** placental membrane.

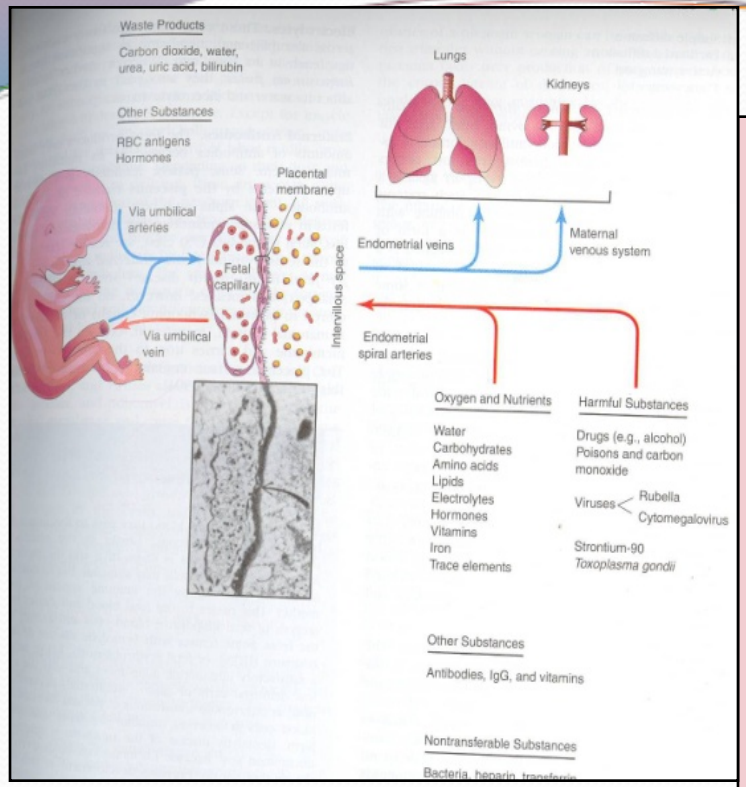
FUNCTIONS OF THE PLACENTA



- **1. Metabolic :**
- **Synthesis of: Glycogen, Cholesterol and Fatty Acids**.
- They supply the fetus with nutrients and energy.
- **2.Transportation of:**
- **(A) Gases:**
- Exchange of O2, CO2 and CO is through **simple diffusion.**
- The fetus extracts (20 –30) ml of O2/minute from the maternal blood.



- **(B) Nutrients and Electrolytes:**
- Water, Amino acids, Carbohydrates, Vitamins and Free Fatty Acids are rapidly transferred to the fetus.
- **C. Maternal Antibodies:**
- Maternal immunoglobulin G gives the fetus passive immunity to some infectious diseases **(measles, small box) and not to others (chicken box).**

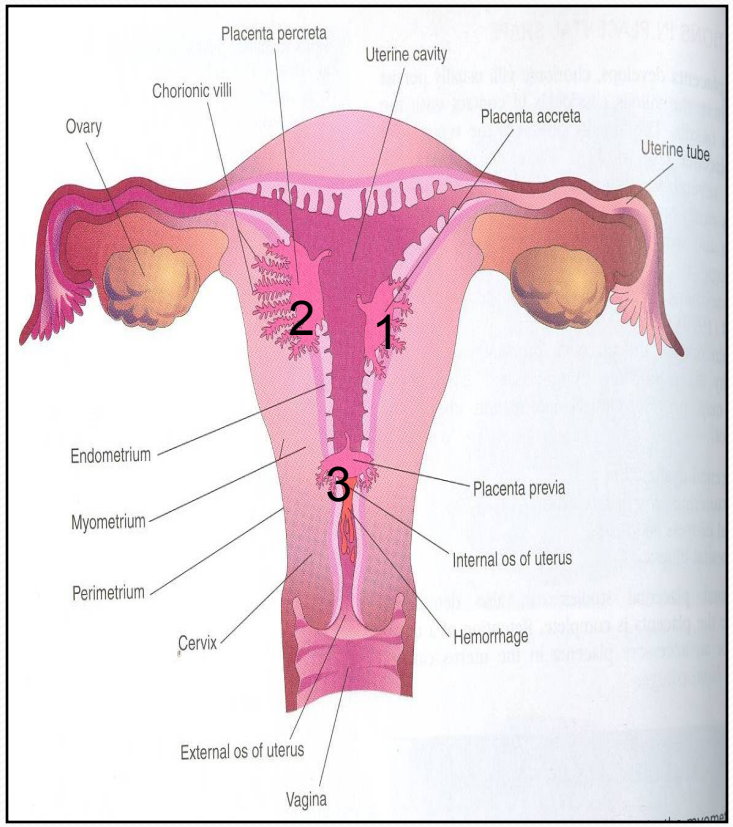


- **(D) Drugs and Drug metabolites:**
- They cross the placenta by simple diffusion.
- They can affect the fetus directly or indirectly by interfering with placental metabolism.
- **(E) Hormones:**
- **Protein hormones** do not reach the embryo in sufficient amounts.
- some of these hormones
- (**Thyroxine** &
- **Testosterone** which may cause masculinization of a female fetus) can cross the placental membrane.
- **F) Waste products:**
- Urea and uric acid pass through the placental membrane by simple diffusion.

- **(3) Endocrine Synthesis:**
- **(1) Progesterone** :
- Maintains pregnancy if the corpus luteum is not functioning well.
- **(2) Estrogen**
- Stimulates uterine growth and development of the mammary glands.
- **3) hCS or Hpl:**
- A growth hormone that gives the fetus the priority on maternal blood glucose.
- It promotes breast development for milk production.
- **(4) hCG:**
- Maintains the corpus luteum and used as **indicator of pregnancy**.

- **Fetal drug addiction can be due to some drugs as Heroin.**
- **All sedatives and analgesics can affect the fetus to some degree.**
- **Drugs used for management of labor can cause respiratory distress to the newborn.**

ANOMALIES OF PLACENTA

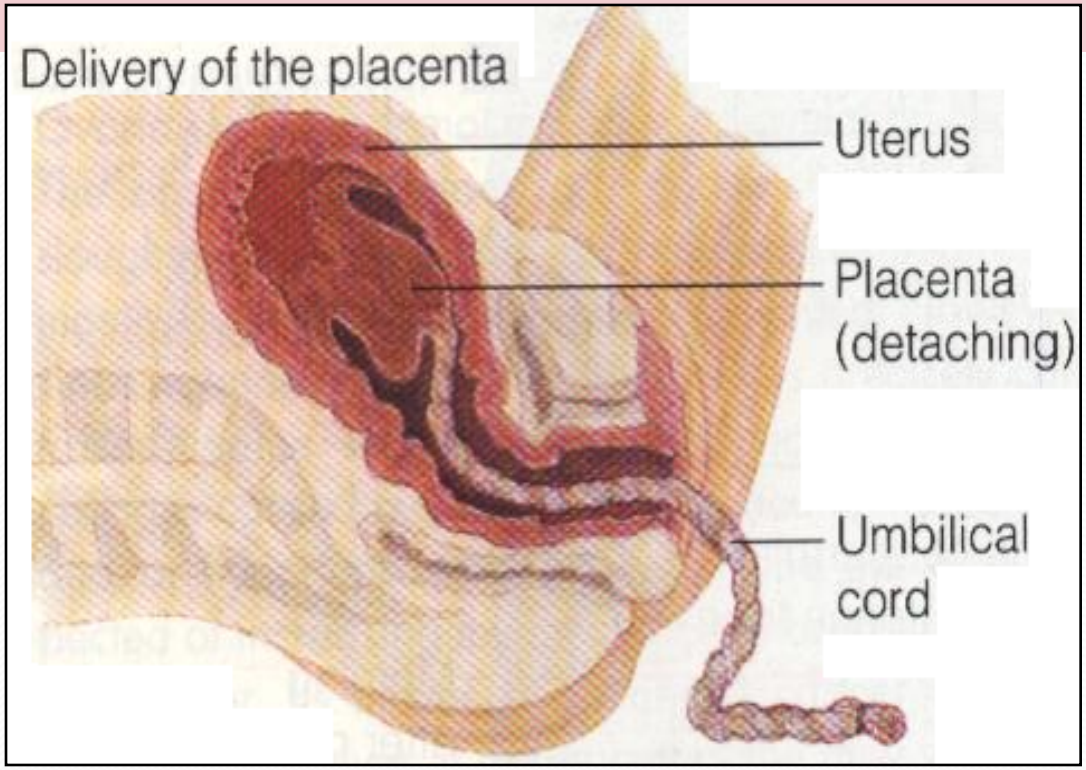


- **1. Placenta Accreta:**
- Abnormal absence of chorionic villi with partial or complete absence of the decidua basalis.
- **2. Placenta Percreta:**
- Chorionic villi penetrate the myometrium to the perimetrium.
- The most common presenting sign of these two anomalies is trimester bleeding.

- **3. Placenta Previa:**
- The blastocyst is implanted close to or overlying the internal uterine os.
- It is associated with late pregnancy bleeding.
- Delivery is through Cesarean section.

Fate of Placenta

- The strong uterine contractions that continue after birth compress uterine blood vessels to limit bleeding & cause the placenta to **detach** from the uterine wall (within 15 minutes after birth of the infant).



THANK YOU