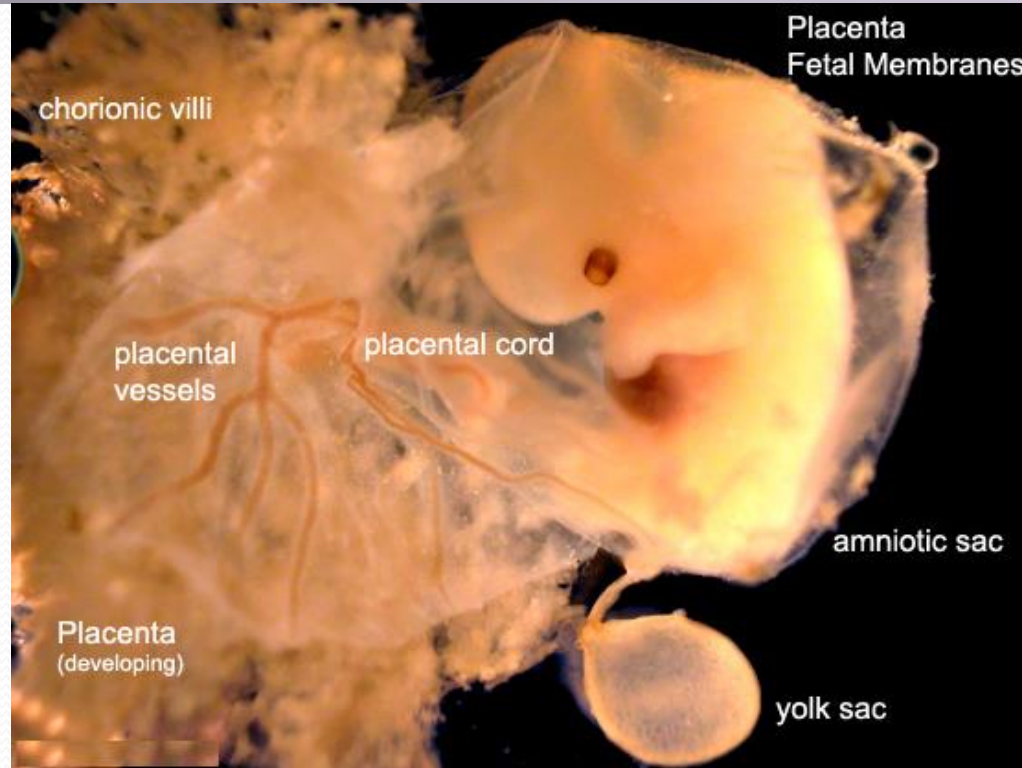
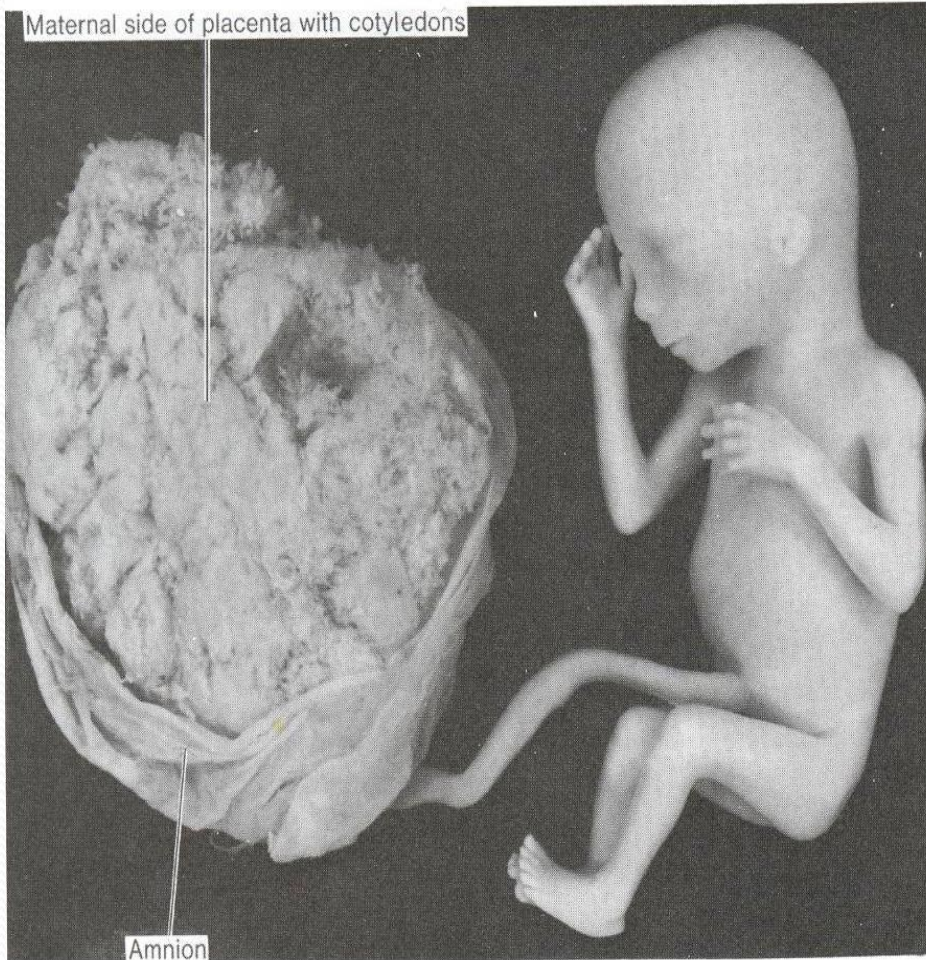


PLACENTA



Dr. Saeed Vohra

PLACENTA



- It is a **Fetomaternal** organ.
- 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.

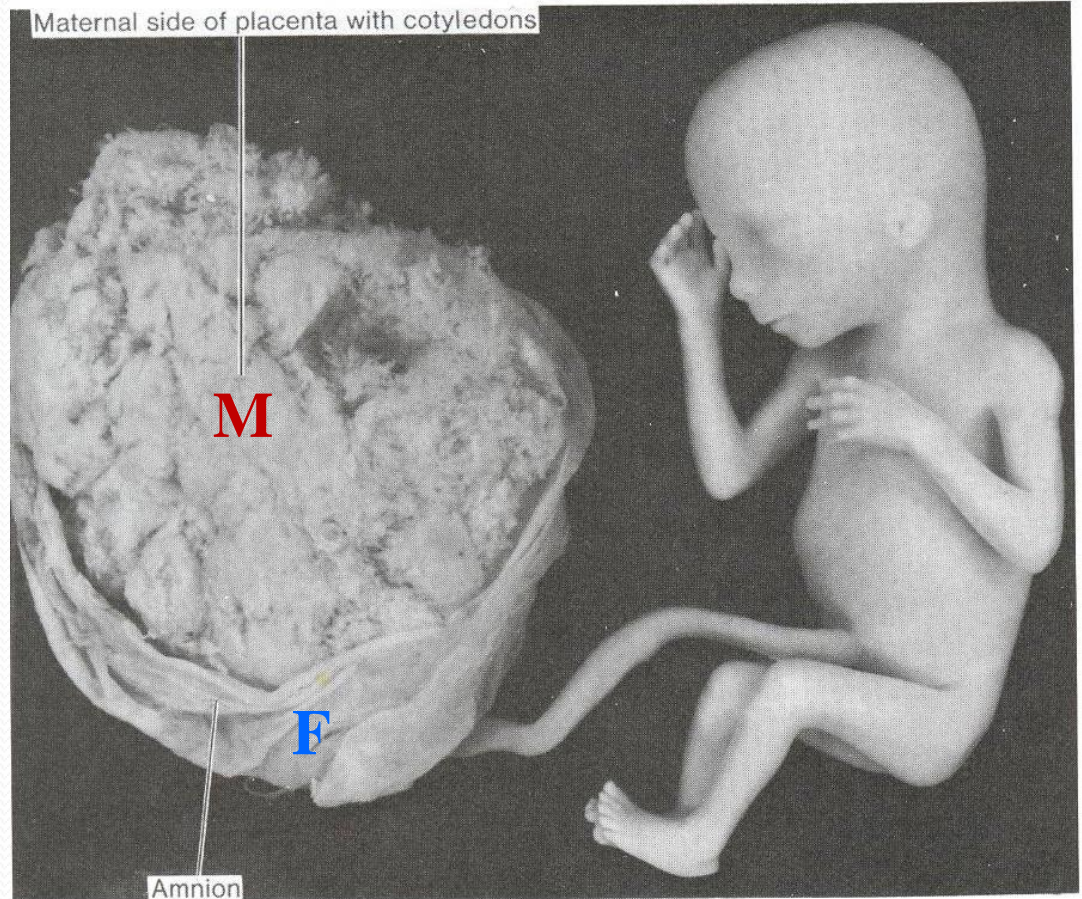
Full Term Placenta

Discoid in shape.

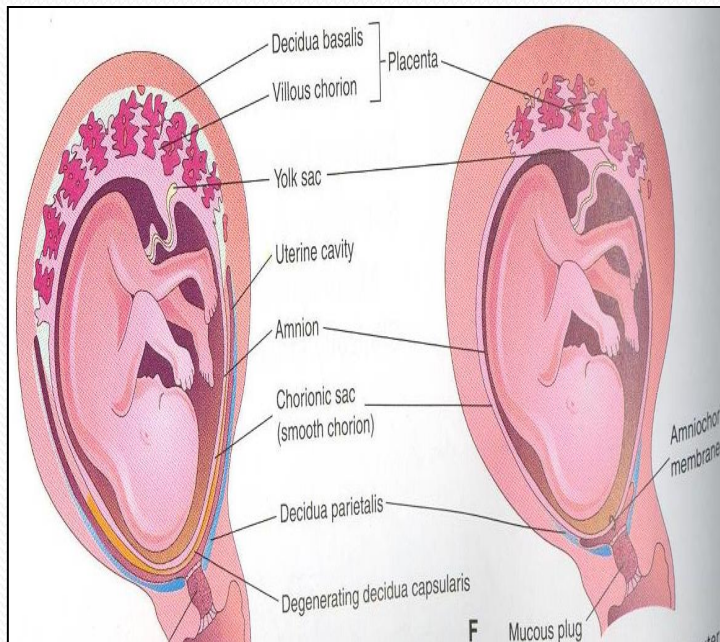
Weighs (500 – 600)g.

Has two surfaces:

1. Fetal
2. Maternal



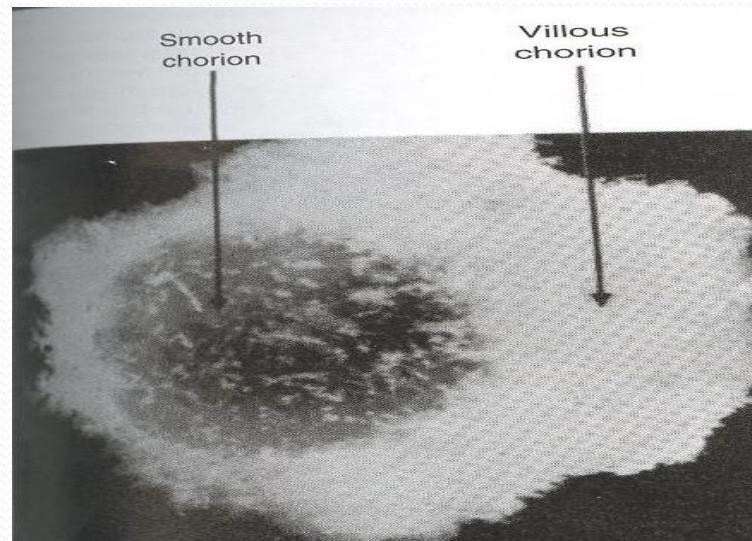
Formation of Placenta



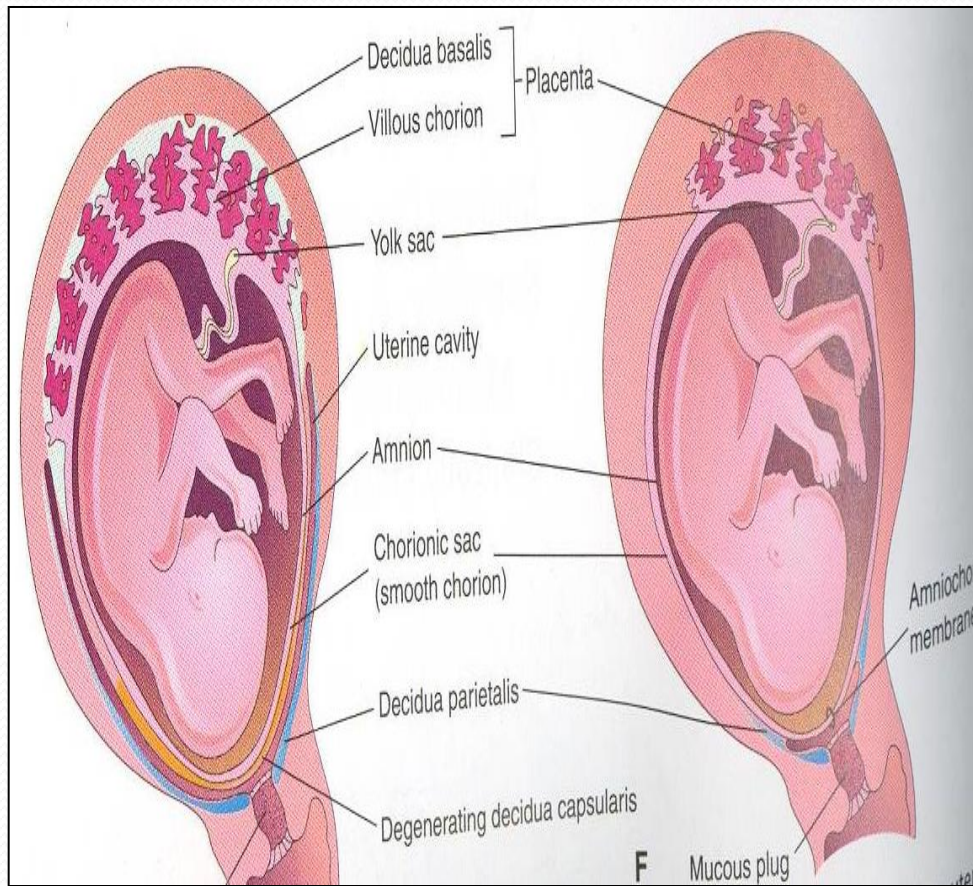
• Fetal Part:

• Villous Chorion

- It is the bushy area at the embryonic pole
- The villi are more in number, enlarged and branch profusely.



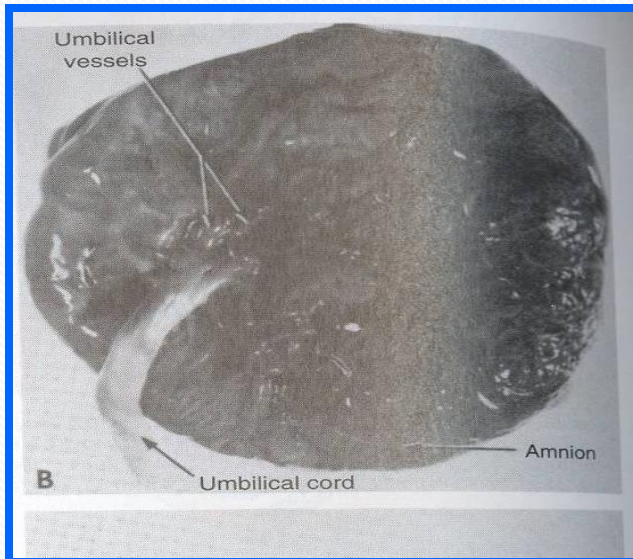
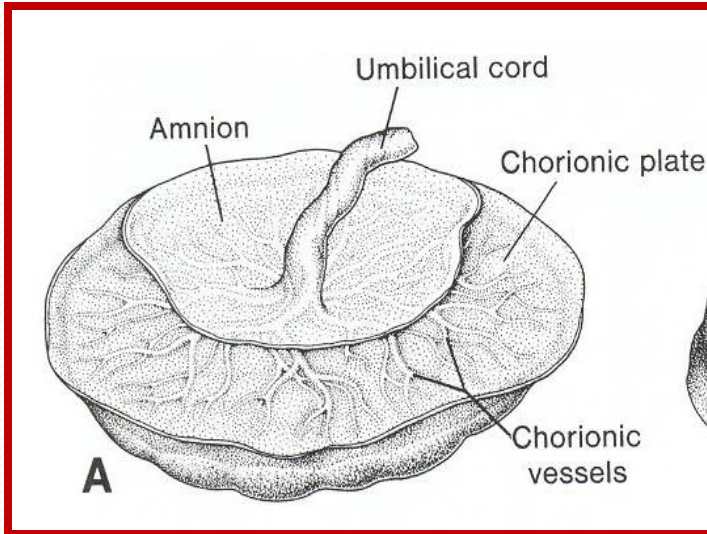
Formation of Placenta



● Maternal Part:

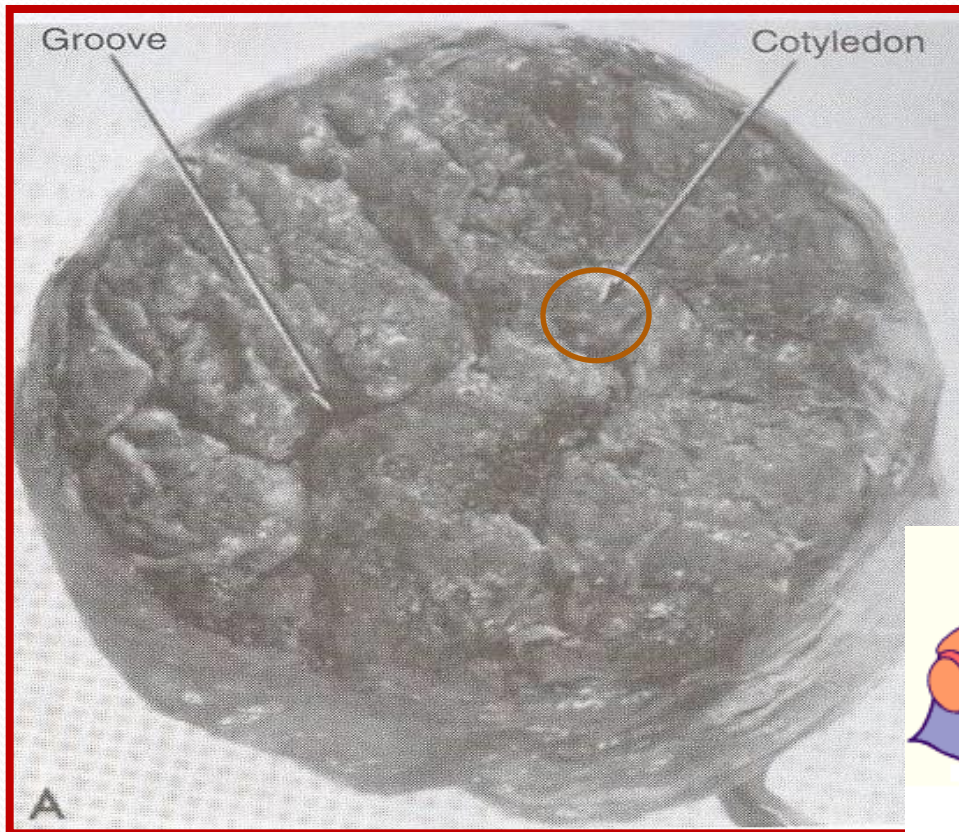
- **Decidua Basalis** part of the decidua deep to the conceptus
- **Decidua (Gravid Endometrium):** it is the functional layer of the endometrium in pregnancy which is shed after parturition

Fetal Surface

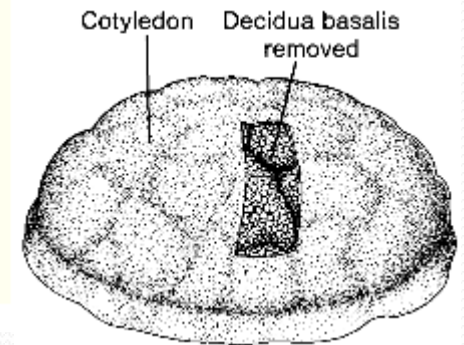
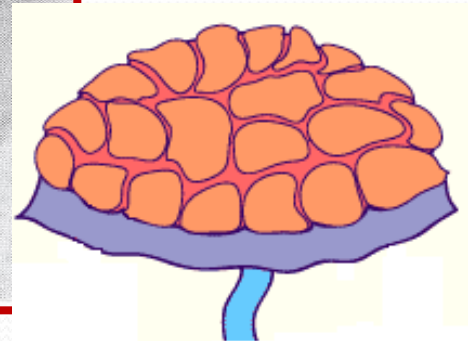


- 1. Smooth because it is covered with the amnion.
- 2. The umbilical cord is attached to its center.
- 3. The chorionic vessels are radiating from the umbilical cord.

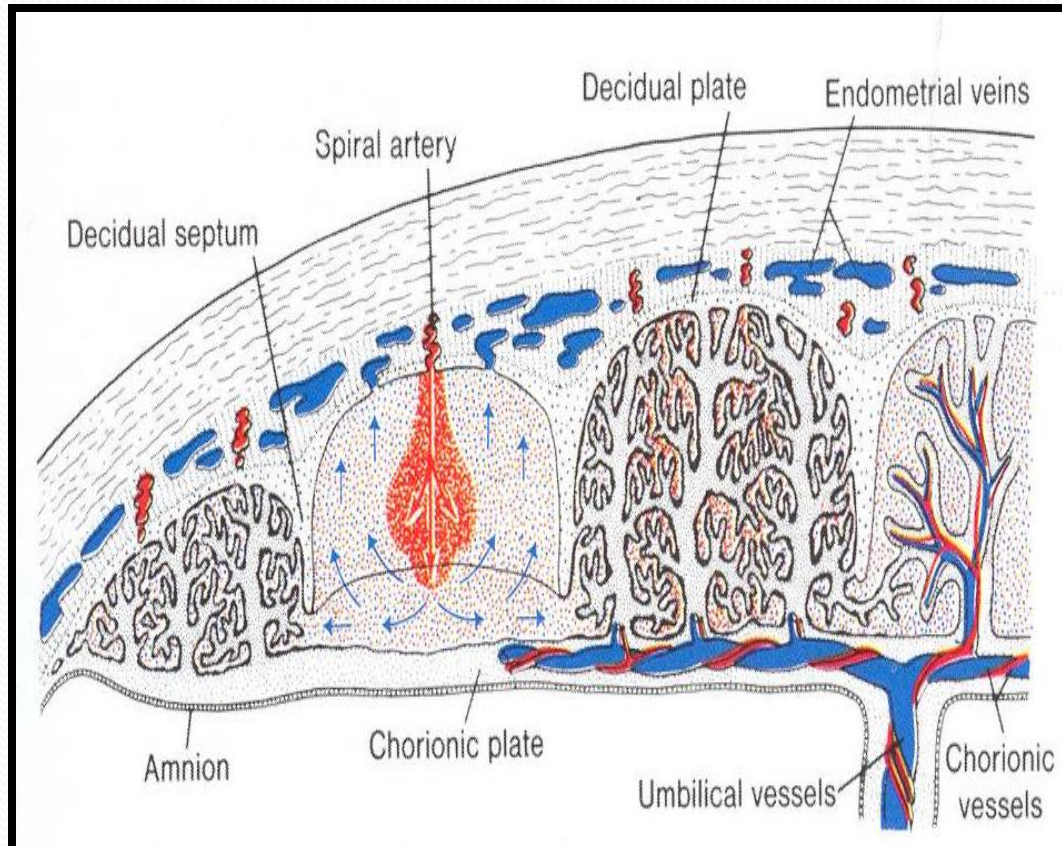
Maternal Surface



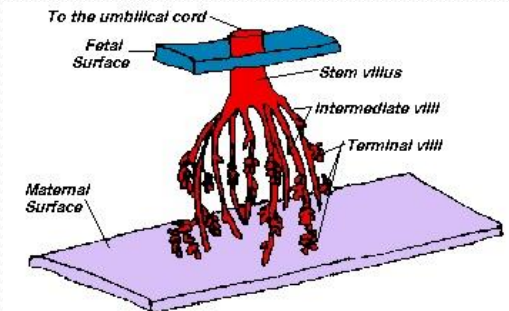
- Is rough, formed of (15–20) irregular convex areas (Cotyledons)
- The cotyledons are separated by grooves (placental septa).
- Each cotyledon is covered by a thin layer of decidua basalis.



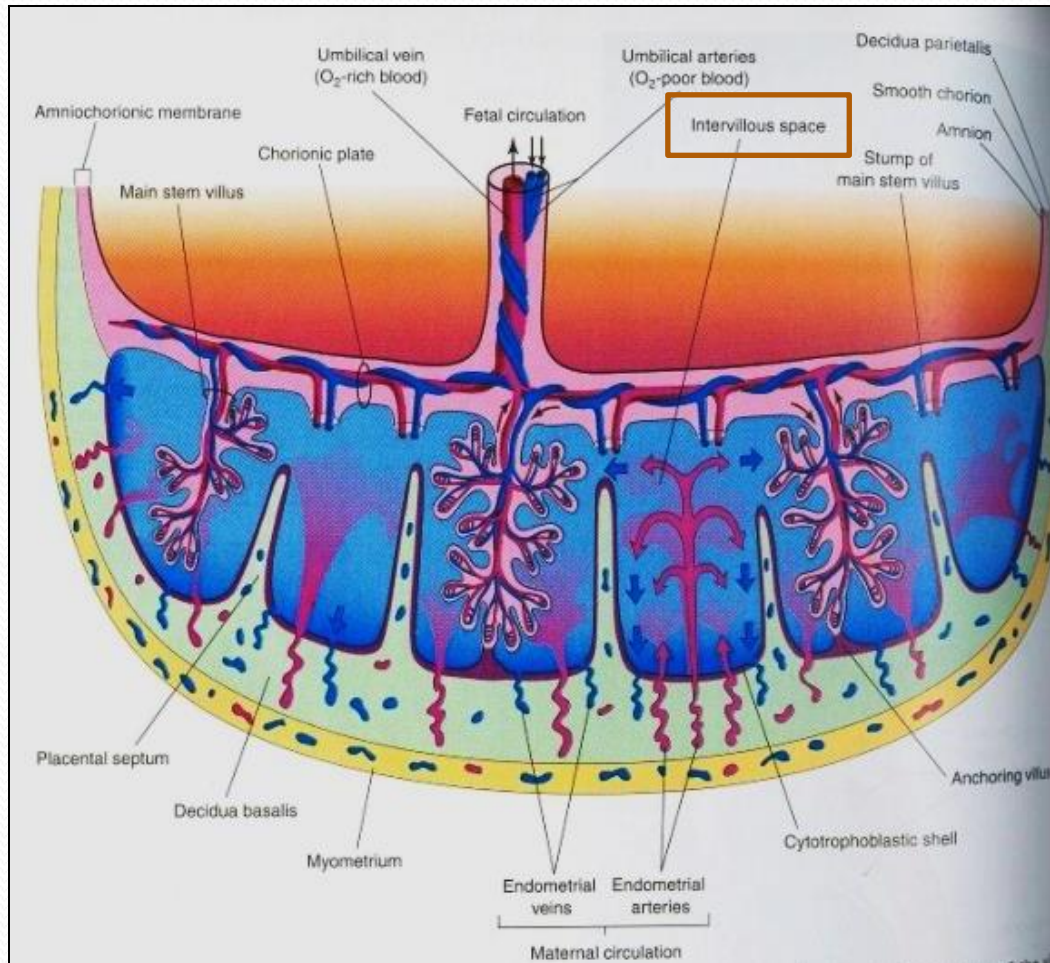
Structure of a Cotyledon



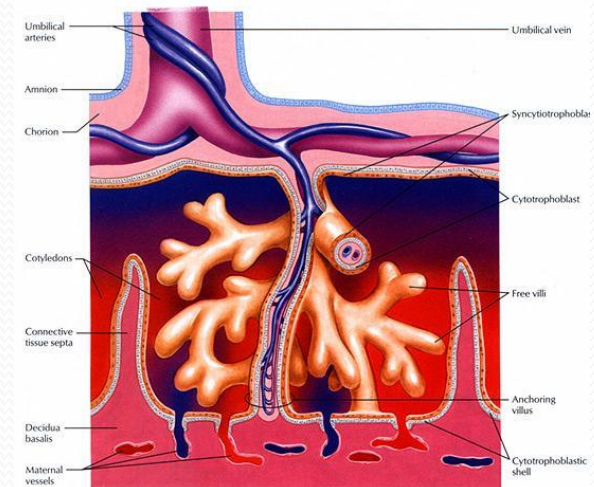
- It consists of two or more stem villi with their many branched villi.
- It receives (80-100) maternal spiral arteries that enter the intervillous spaces at regular intervals.



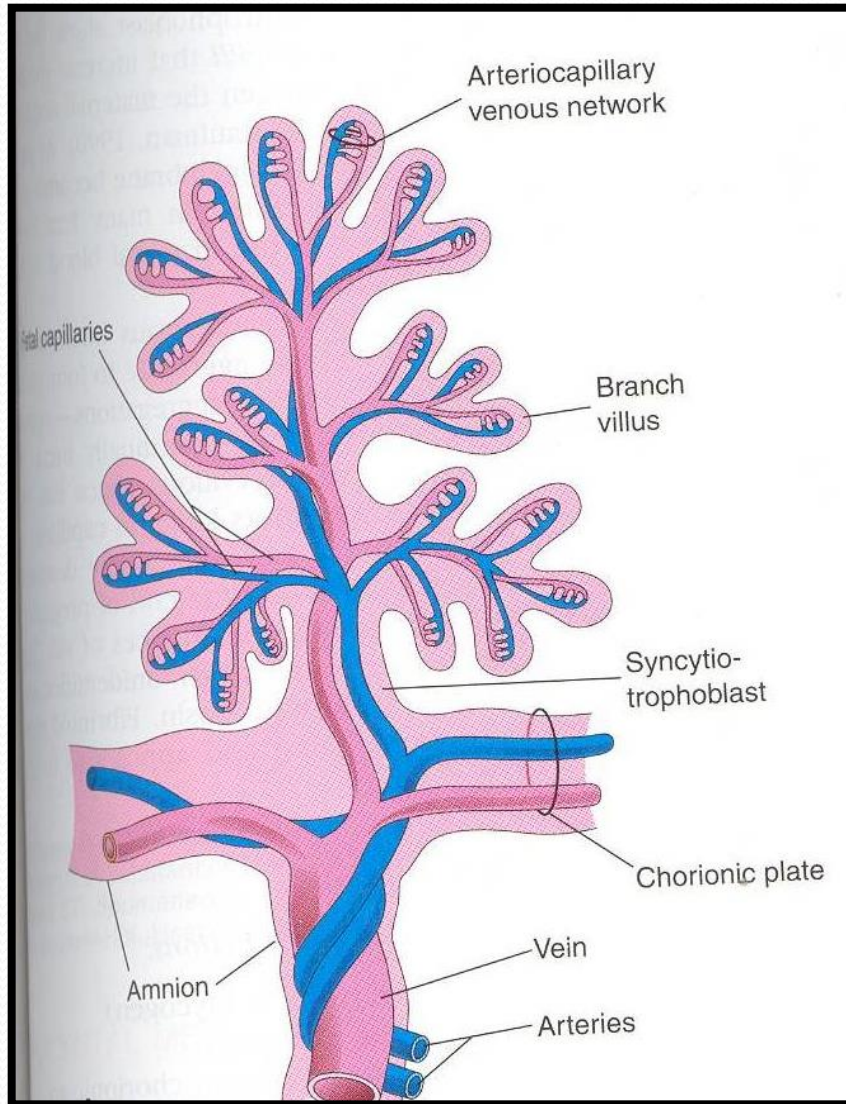
Intervillous Space



- 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.



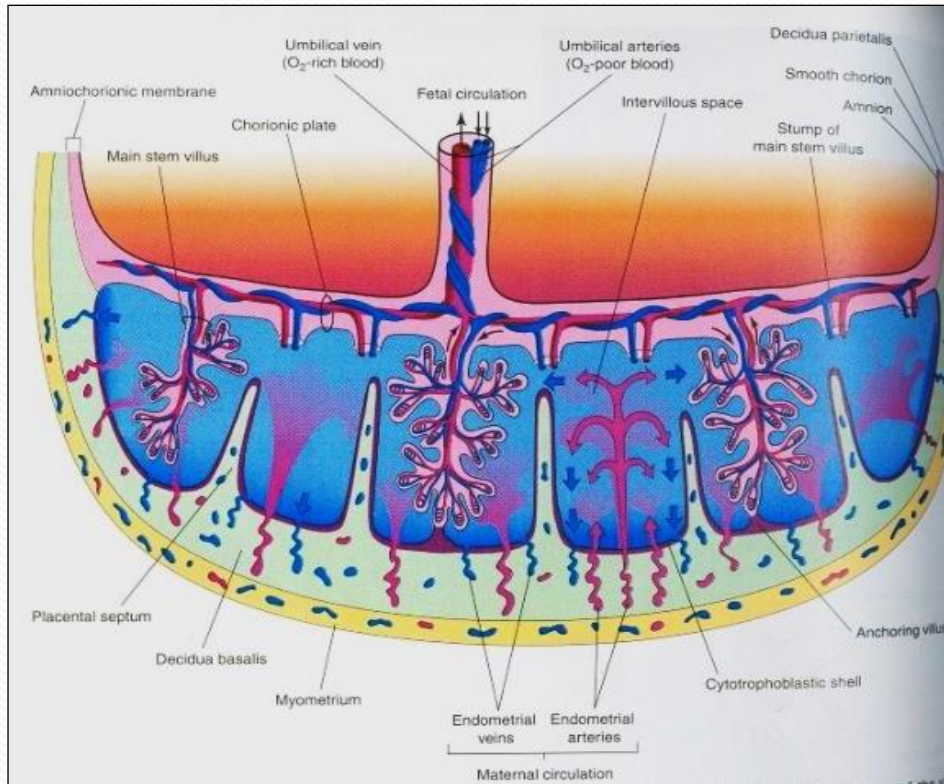
Fetal Placental Circulation



- **Two Umbilical Arteries:**

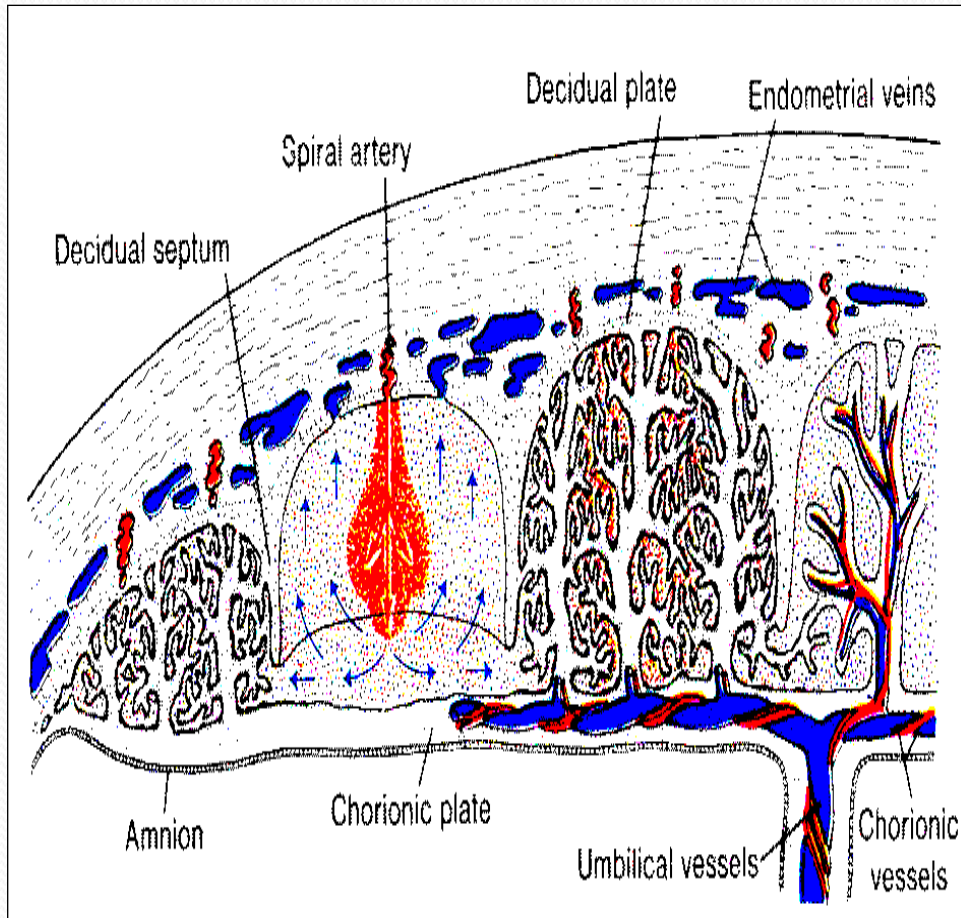
- Carry poorly oxygenated blood from the fetus to the placenta.
- Within the branch chorionic villi, they form:
 - **Arterio-capillary venous network:**
 - It brings the fetal blood extremely close to the maternal blood.
 - The well oxygenated fetal blood in the capillaries passes into veins accompanying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

Maternal Placental Circulation



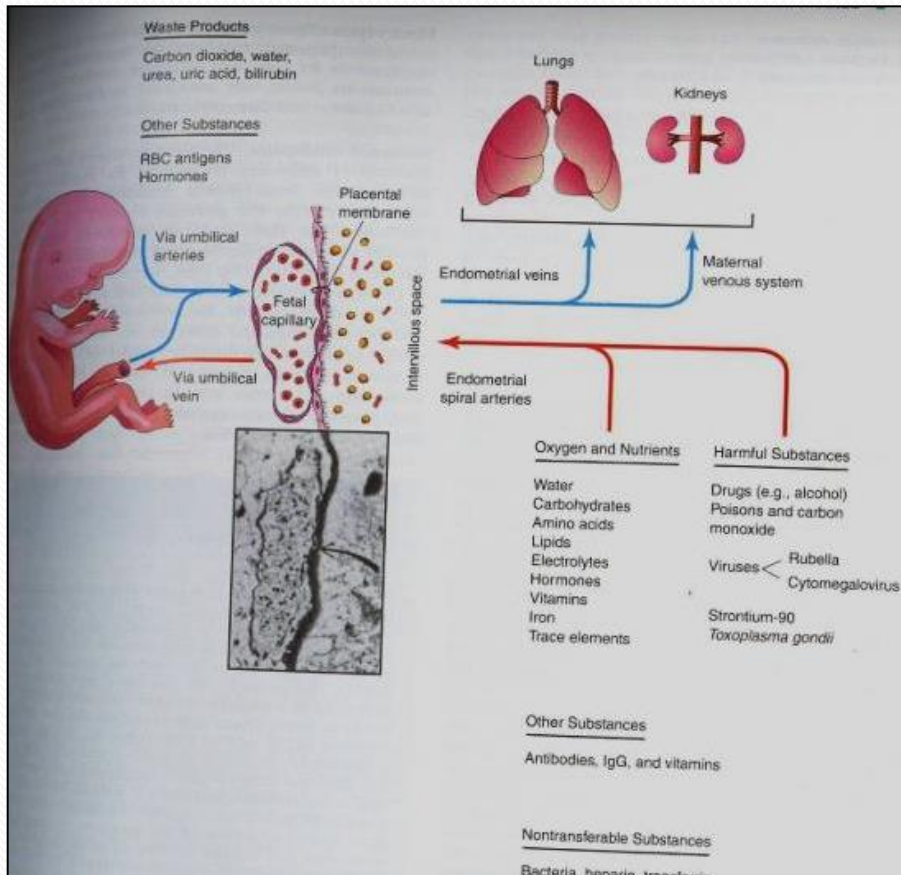
- 80 –100 **spiral endometrial arteries** discharge into the intervillous space.
- The blood is propelled in jet like fountains by the maternal blood pressure.
- The pressure of this entering blood is higher than that in the intervillous space.
- It forms a roof of the space.
- As the pressure dissipates,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

Maternal Placental Circulation



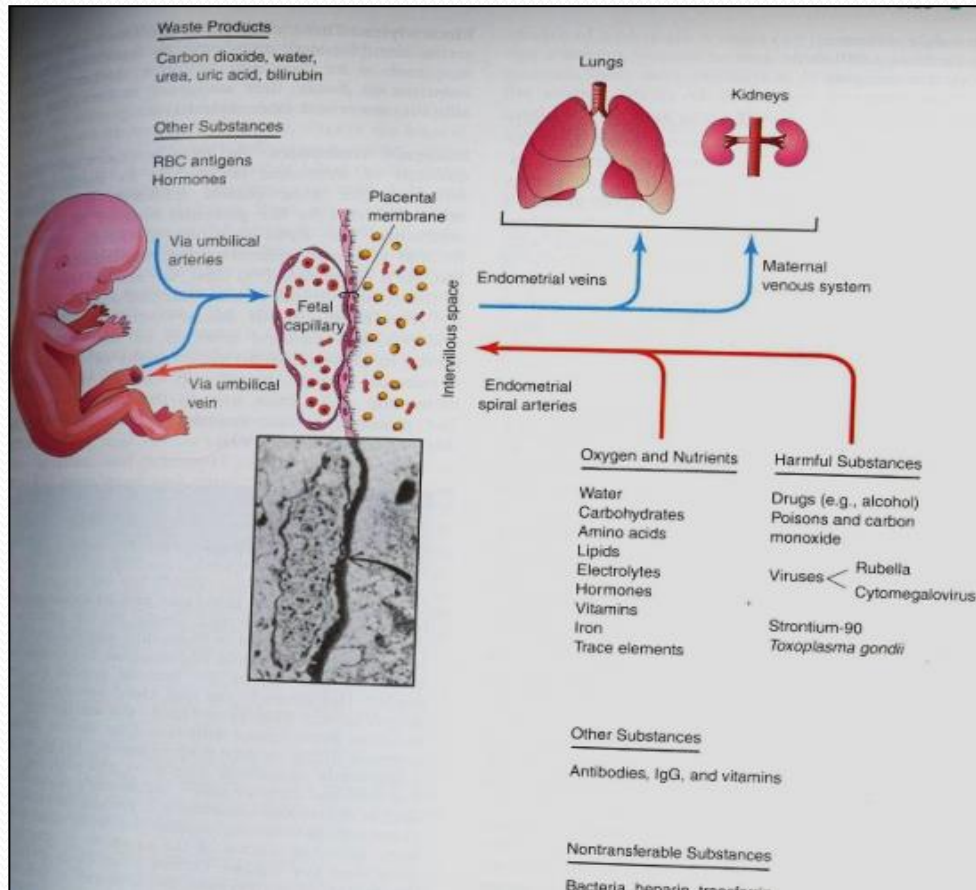
- Exchange of metabolites and gases with the fetal blood.
- As the pressure decreases, the blood flows back from the chorionic plate and enter the endometrial veins to the maternal circulation.

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
 - The fetus extracts (20 – 30) ml of O₂/minute from the maternal blood.

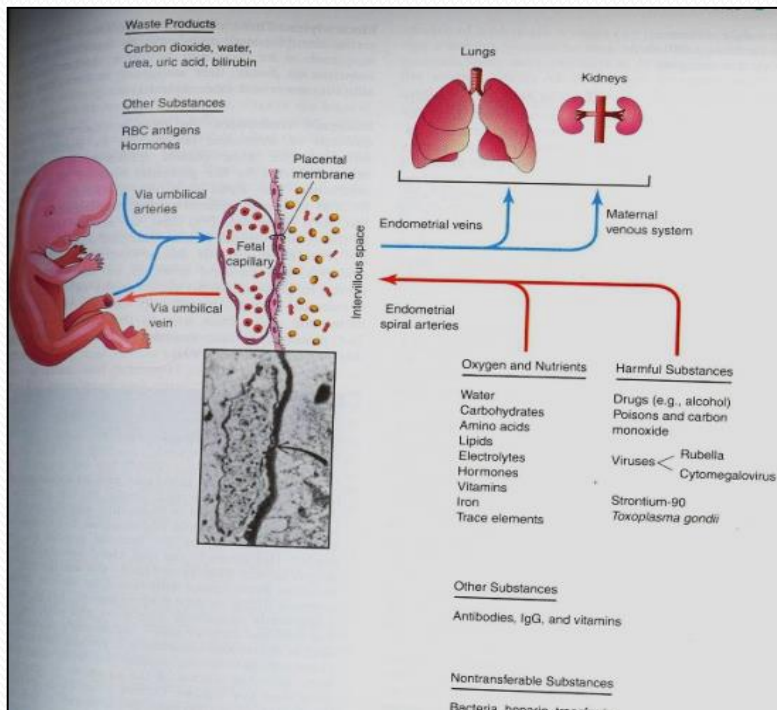
Functions of The Placenta



Transportation of:

- **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).

Functions of The Placenta



Transportation of:

• 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

Functions of the Placenta

- **3. Endocrine Synthesis:**

- **Progesterone**

- Maintains pregnancy if the corpus luteum is not functioning well.

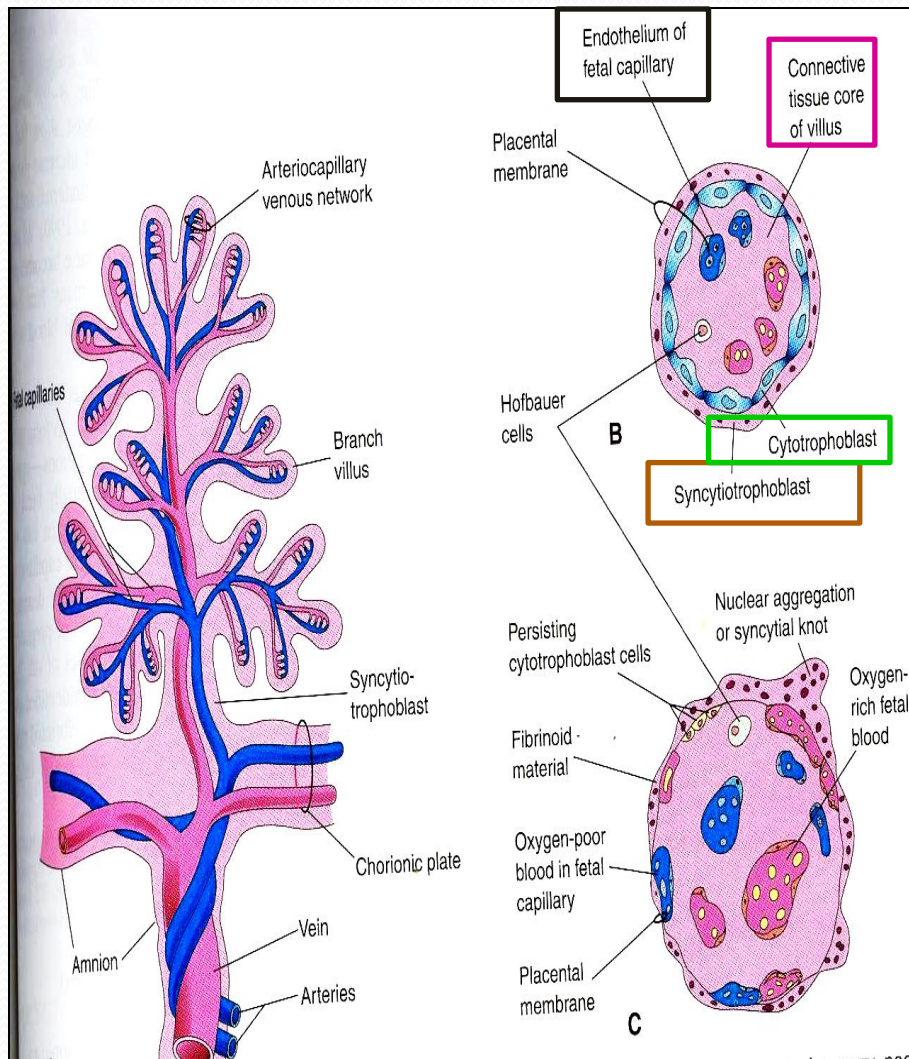
- **Estrogen**

- Stimulates uterine growth and development of the mammary glands.

- **3 hCS or Hpl** (*Human chorionic somatomammotropin or Human Placental Lactogen*)

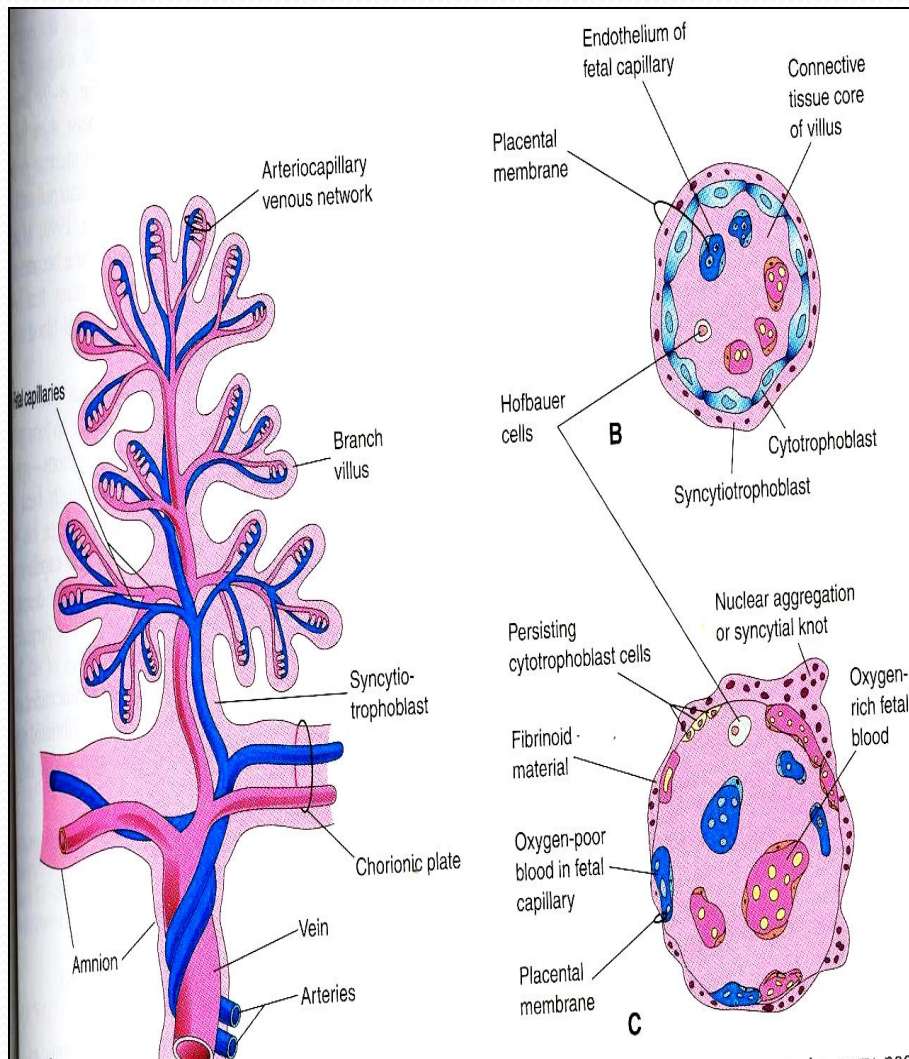
- A growth hormone that gives the fetus the priority on maternal blood glucose. Maintains the corpus luteum and used as indicator of pregnancy.
- It promotes breast development for milk production.

Placental Membrane

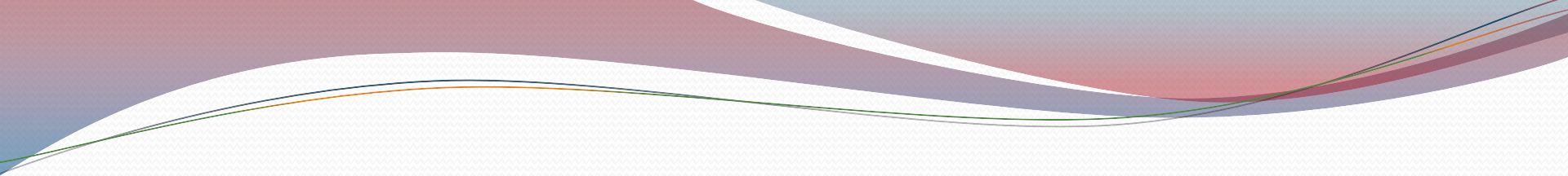


- It is a composite thin membrane of extra fetal tissues which **separates** the fetal and maternal bloods.
- Up to (20) weeks, it is composed of (4) layers:
 - Syncytiotrophoblast.
 - Cytotrophoblast.
 - Connective tissue of the villus.
 - Endothelium of fetal capillaries.

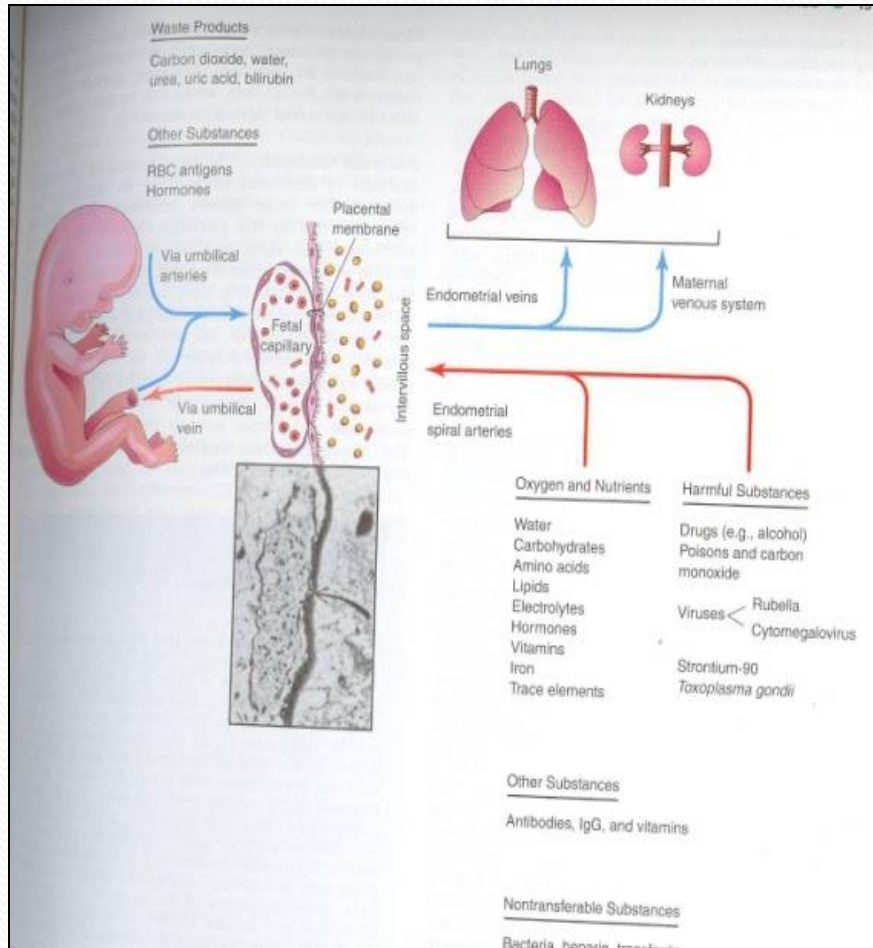
Placental Membrane



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

- 
- **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.**

Mechanism of Transportation



- The transport through the placental membrane is by one of the following mechanisms

1. Simple (passive) diffusion

- Depends on difference in pressure.

2. Active transport

- Requires energy.

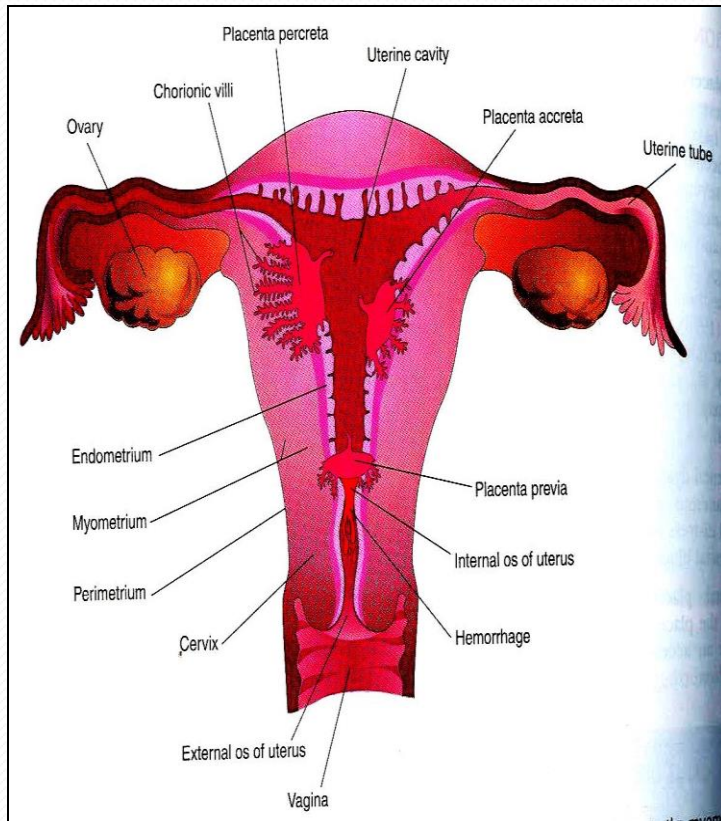
3. Facilitated transport

- Through electrical discharge.

4. Pinocytosis

- The material engulfed is a small sample of extracellular fluid.

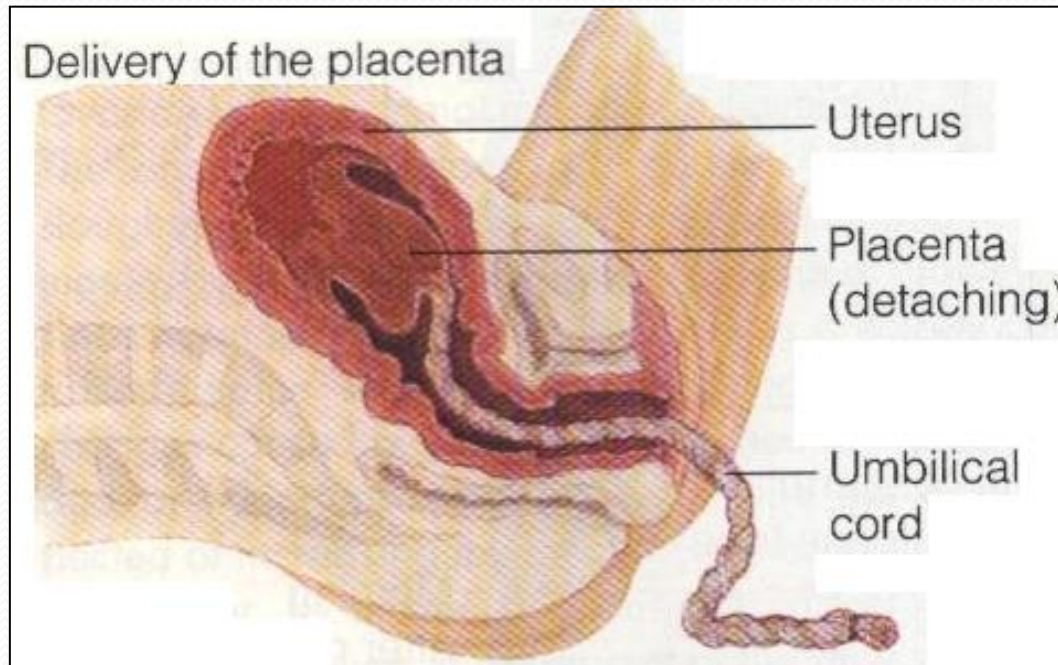
Anomalies of Placenta



- **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

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





Best of Luck