

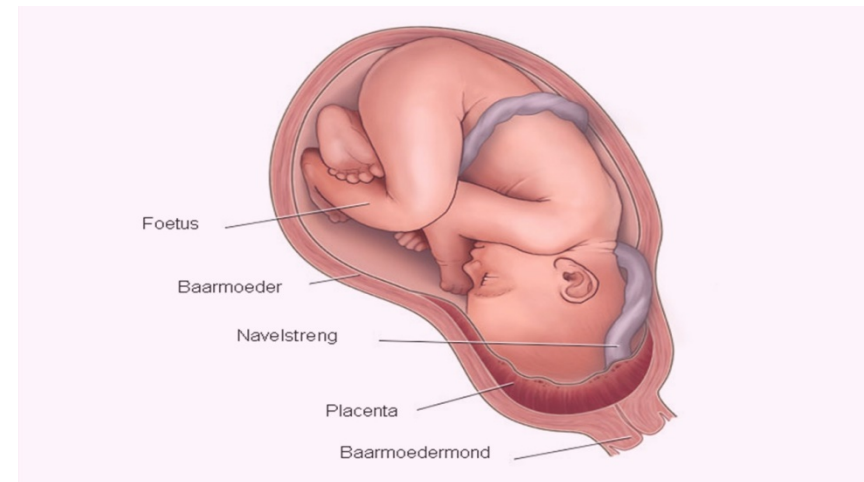
PLACENTA



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INTRODUCTION

- ❑ 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 mother and fetus.



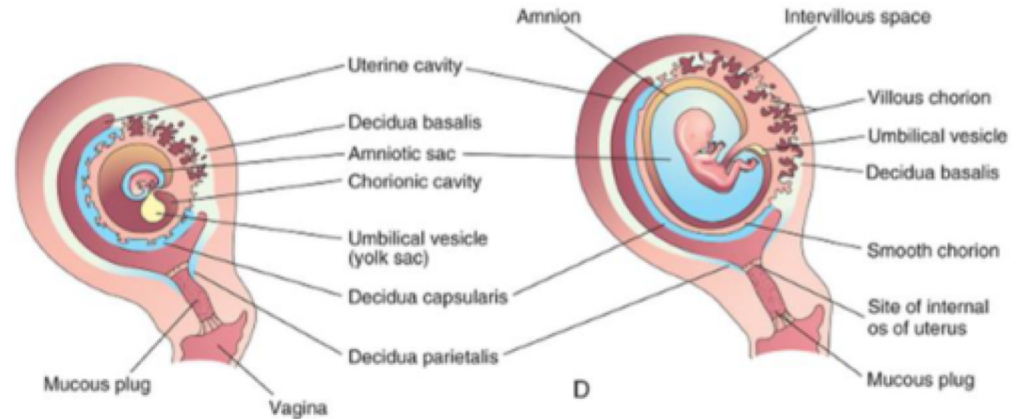
FORMATION

❑ 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
- 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.
- ❑ Diameter 15-25 cm.
- ❑ Thickness 2-3 cm.
- ❑ Umbilical cord is attached to the center.
- ❑ It has two surfaces:
 - Fetal
 - Maternal



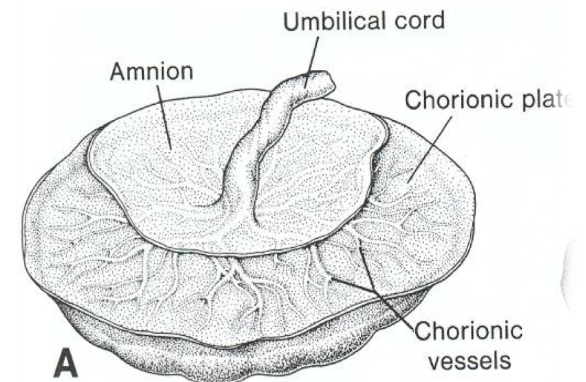
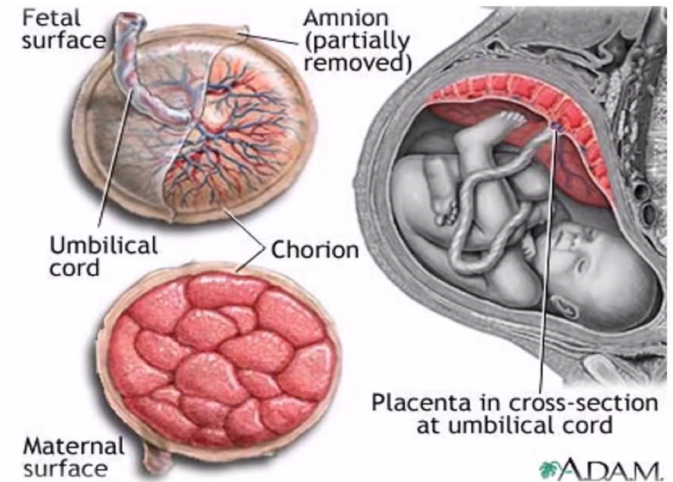
SURFACES

❑ FETAL SURFACE

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

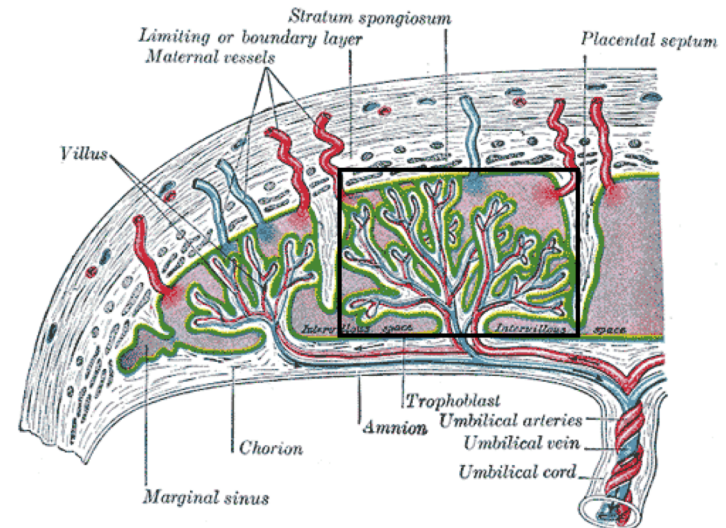
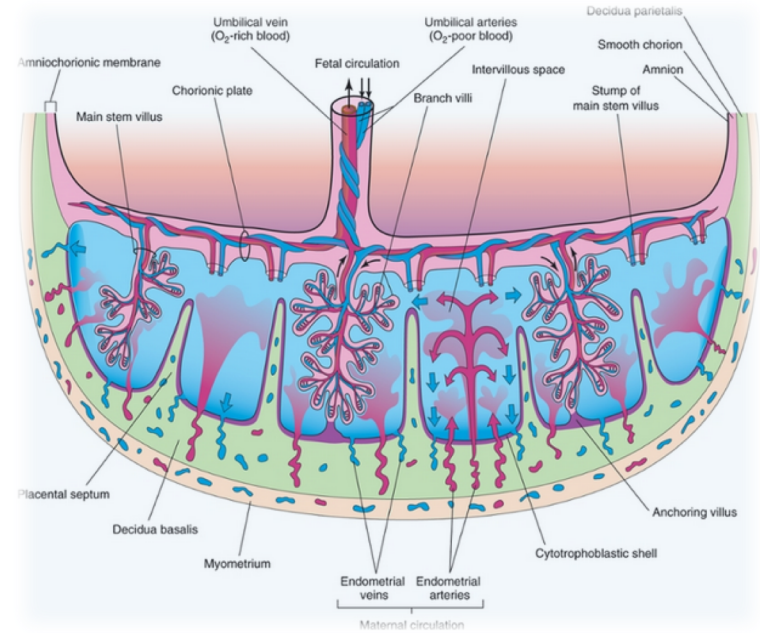
❑ MATERNAL SURFACE

- 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.



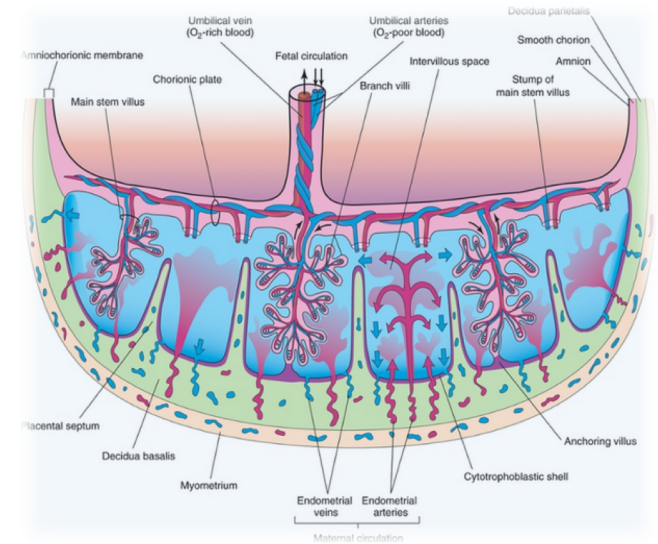
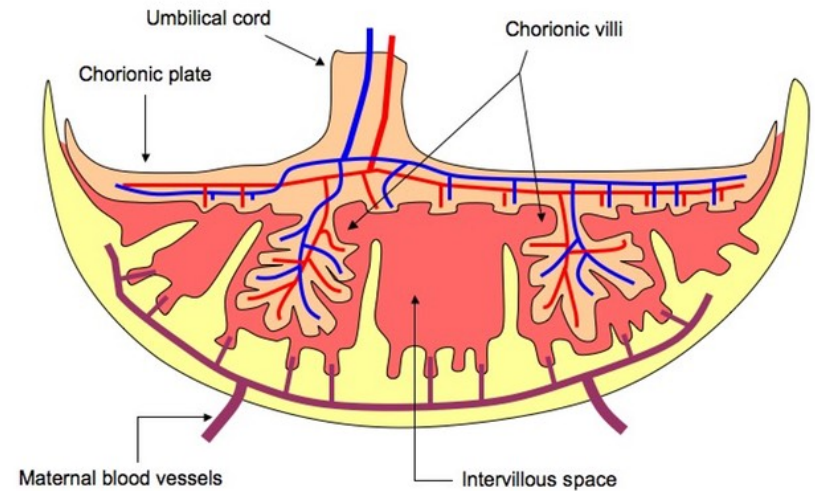
STRUCTURE OF A COTYLEDON

- ❑ 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.



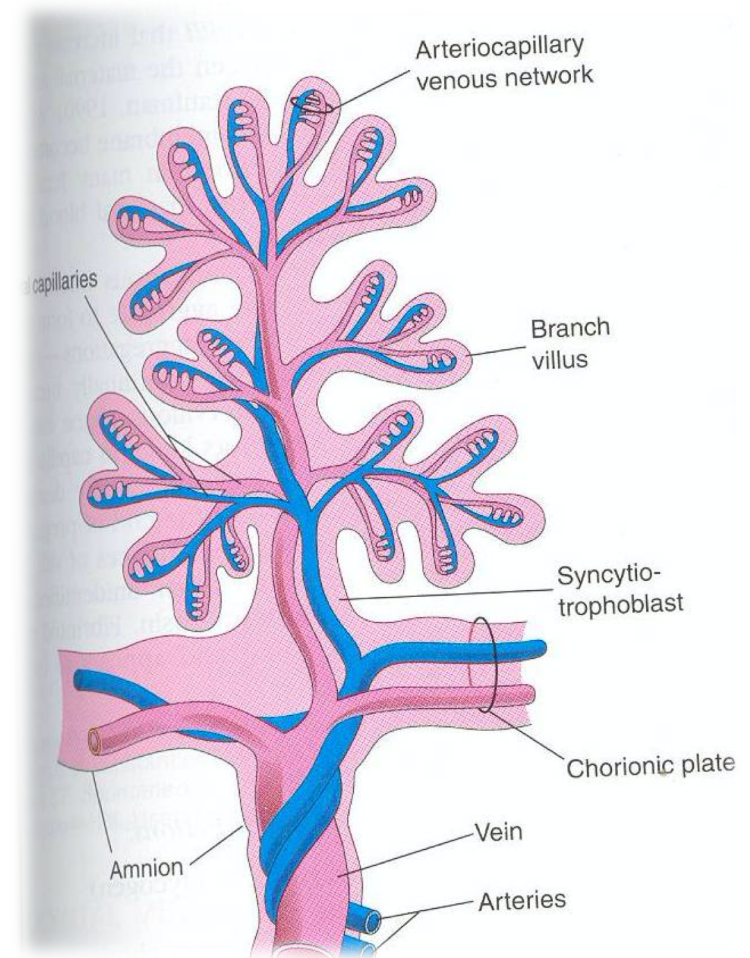
INTERVILLOUS SPACE

- ❑ 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.



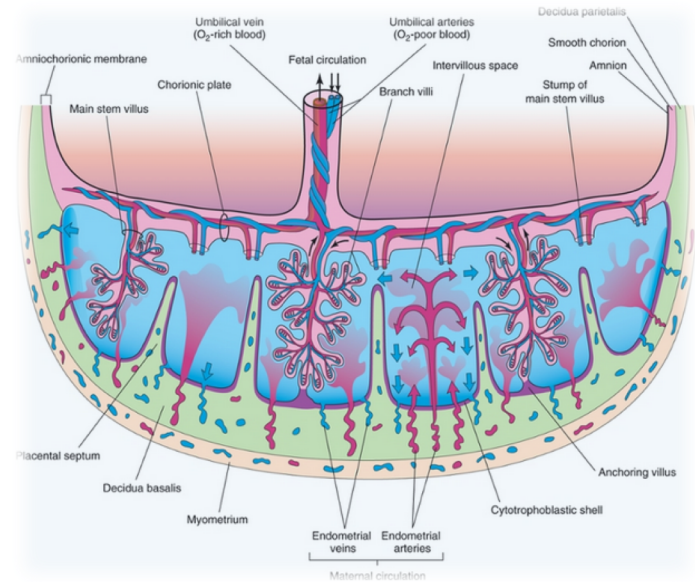
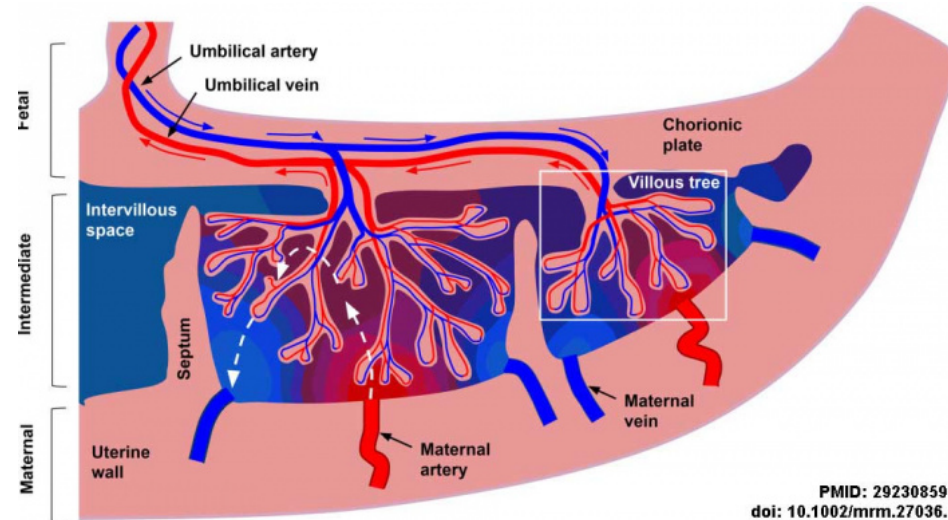
FETAL PLACENTAL CIRCULATION

- ❑ **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.**



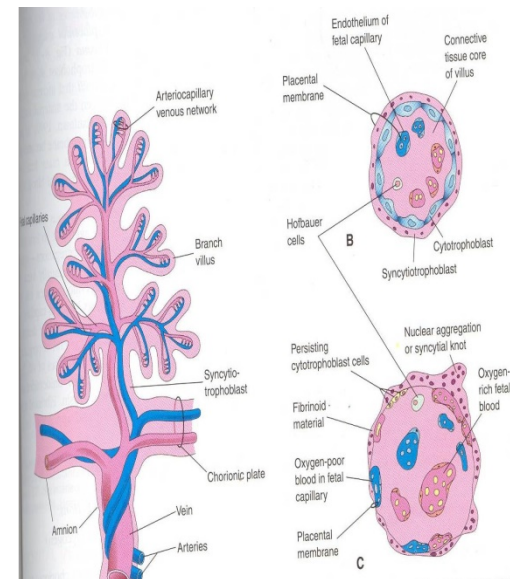
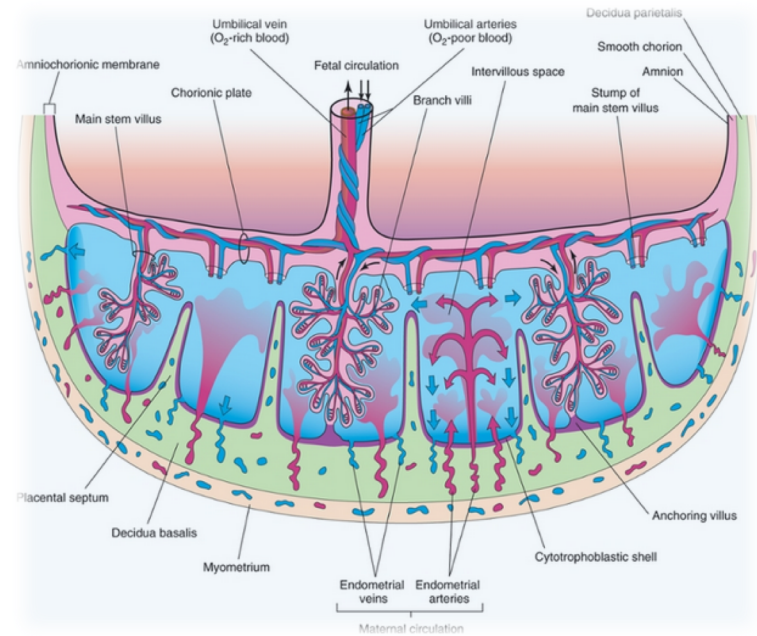
MATERNAL PLACENTAL CIRCULATION

- ❑ 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 **four** layers:
 1. Syncytiotrophoblast.
 2. Cytotrophoblast.
 3. Connective tissue of the villus.
 4. Endothelium of fetal capillaries.
- ❑ At full term it becomes thinner and composed of **three** layers only:
 1. Syncytiotrophoblast.
 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

☐ Metabolic

- Synthesis of Glycogen, Cholesterol and Fatty Acids.
- They supply the fetus with nutrients and energy.

☐ Transportation

➤ Gases:

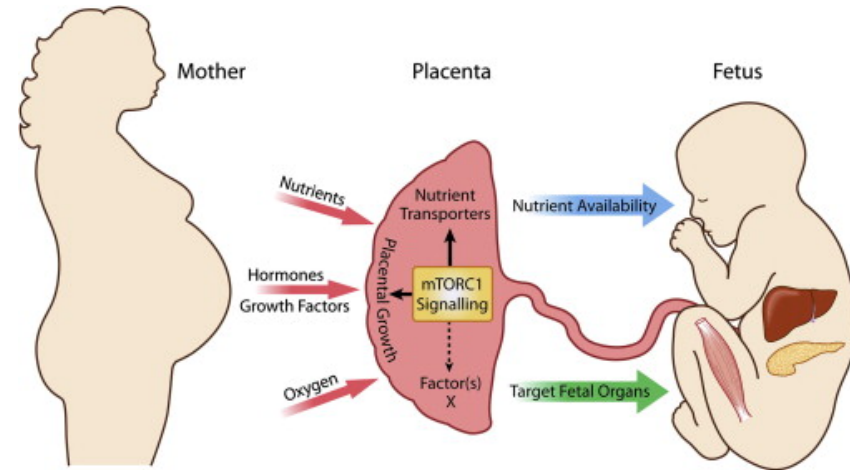
- Exchange of O₂, CO₂ and CO is through simple diffusion.
- The fetus extracts (20 –30) ml of O₂/minute from the maternal blood.

➤ Nutrients and Electrolytes:

- Water, Amino acids, Carbohydrates, Vitamins and Free Fatty Acids are rapidly transferred to the fetus.

➤ Maternal Antibodies:

- Maternal immunoglobulin G gives the fetus passive immunity to some infectious diseases (measles, small box) and not to others (chicken box).



FUNCTIONS

➤ Drugs and Drug metabolites:

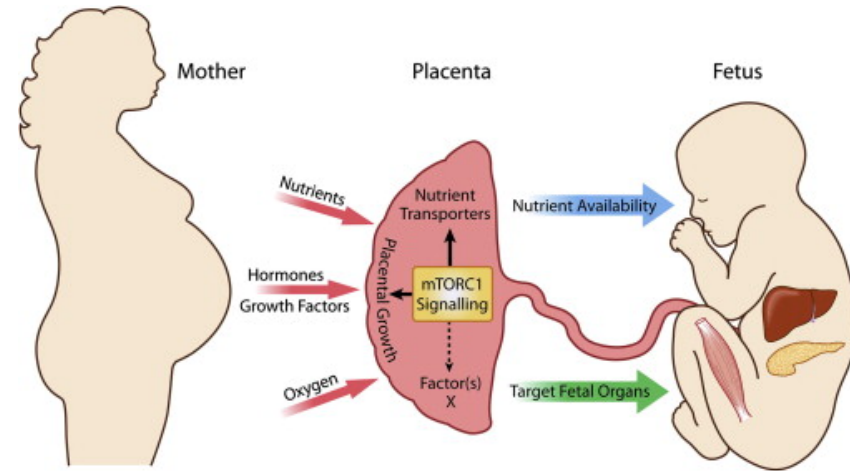
- They cross the placenta by simple diffusion.
- They can affect the fetus directly or indirectly by interfering with placental metabolism.

➤ 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.

➤ Waste products:

- Urea and uric acid pass through the placental membrane by simple diffusion.



FUNCTIONS

□ Endocrine Synthesis:

➤ Progesterone:

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

➤ Estrogen

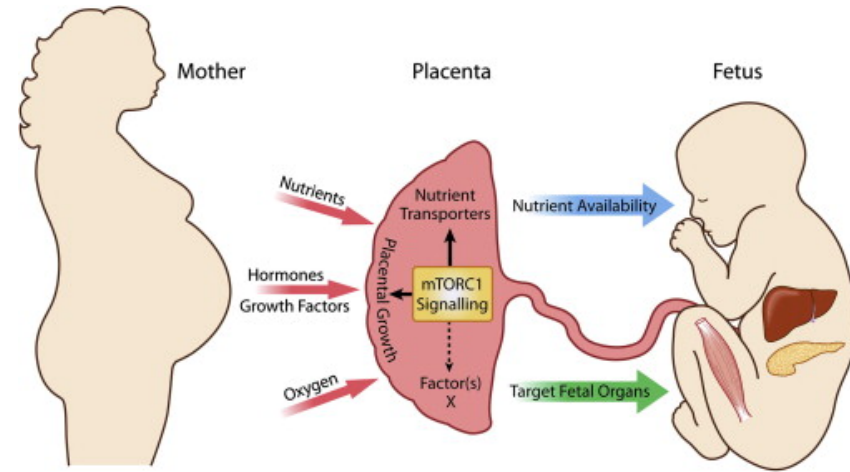
- Stimulates uterine growth and development of the mammary glands.

➤ hCS or Hpl:

- Human placental lactogen (human chorionic somatomammotropin) a growth hormone that gives the fetus the priority on maternal blood glucose.
- It promotes breast development for milk production.

➤ hCG:

- Human chorionic gonadotropin maintains the corpus luteum and used as indicator of pregnancy.



DRUG ADDICTION

- ❑ 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

❑ Placenta Accreta:

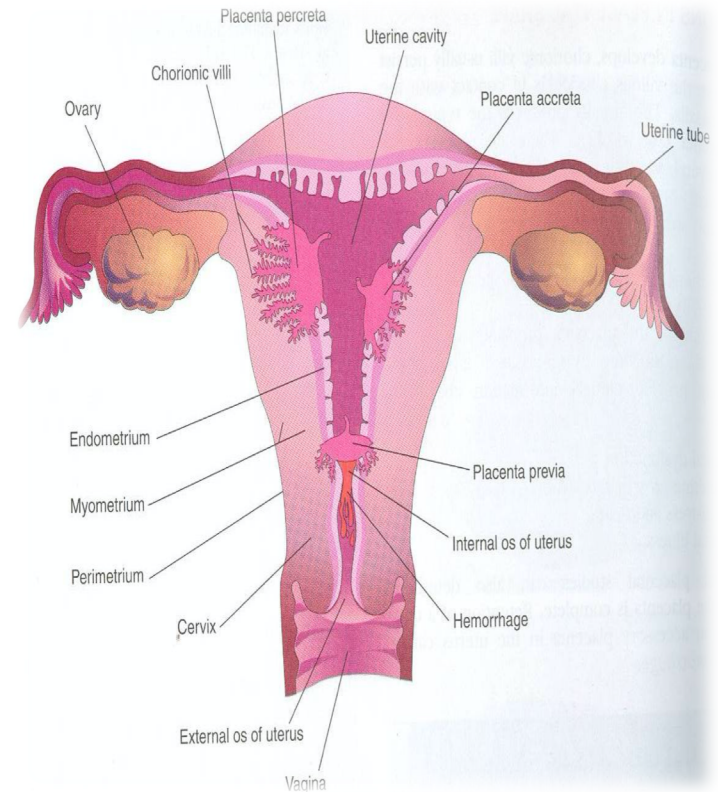
- Abnormal absence of chorionic villi with partial or complete absence of the decidua basalis.

❑ Placenta Percreta:

- Chorionic villi penetrate the myometrium to the perimetrium.
- The most common presenting sign of these two anomalies is trimester bleeding.

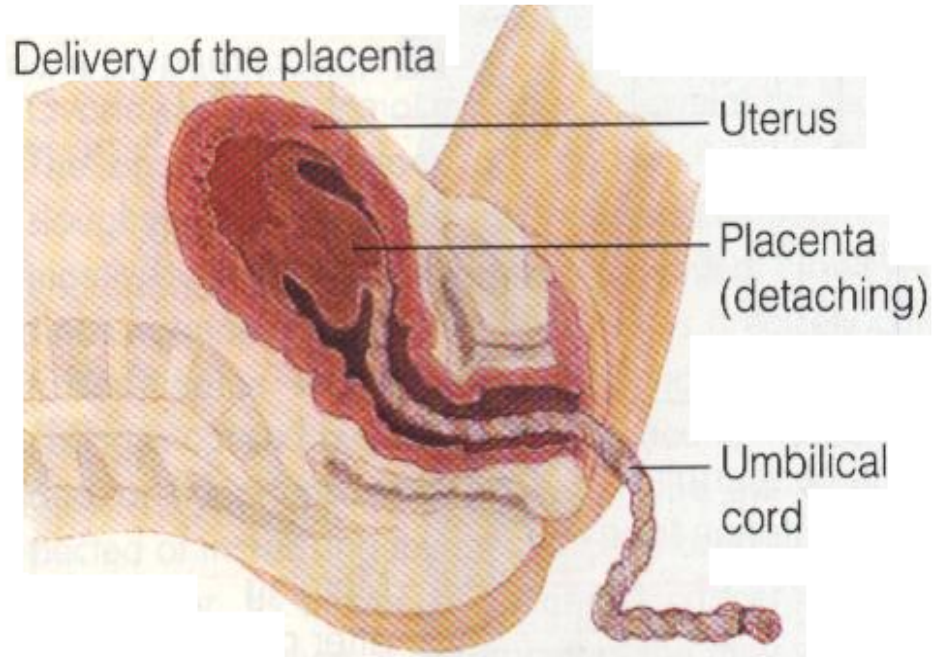
❑ Placenta Previa:

- 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).



QUESTIONS!