

Placenta

Done by:

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- Important
- Extra
- Notes



Placenta



- It is a Fetomaternal structure.
- Formed by the beginning of the **4th month** قبل كذا كان يؤدي وظيفتها الكوريس ليوتيم
- A complete vascular network in placenta is established by the end of the 4th month
- It is the primary site for exchange of gases and nutrients between the mother and the fetus.

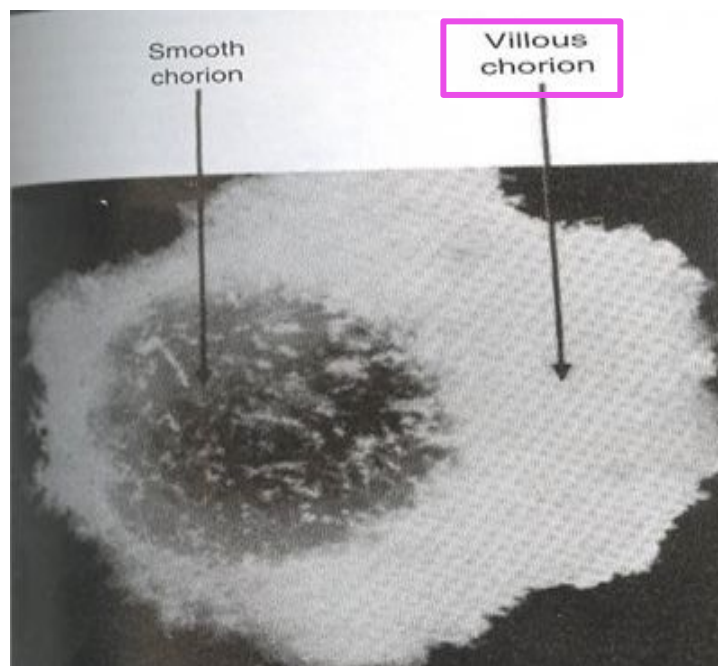
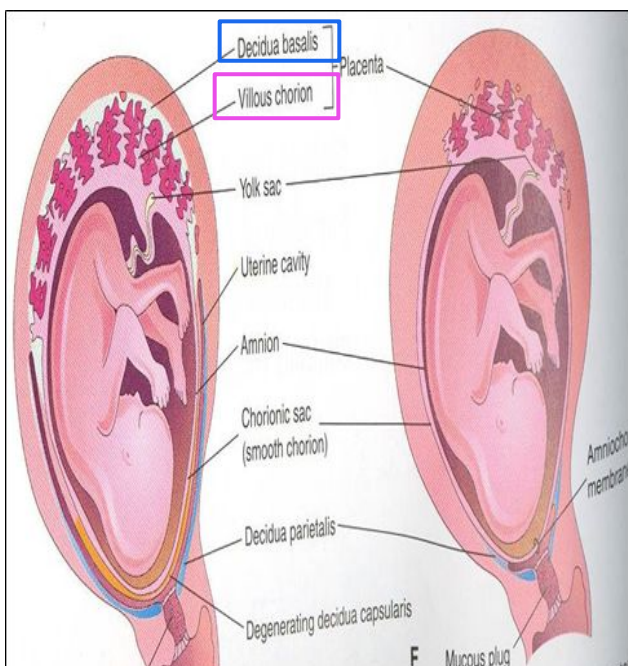
Formation of Placenta

Fetal Part

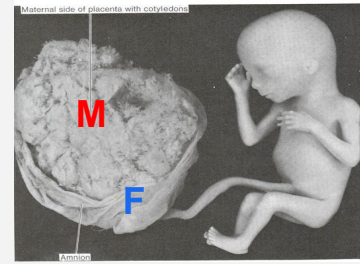
- **Villous Chorion:**
- It is the bushy area at the embryonic pole.
- Its villi are more in number, enlarged and branch profusely.

Maternal Part

- **Decidua Basalis** (part of the decidua deep to the conceptus)
- By the end of 4th month, the decidua basalis is replaced by the fetal component of the placenta
- **Decidua (Gravid Endometrium):** It is the functional layer of the endometrium during pregnancy which is shed after parturition.



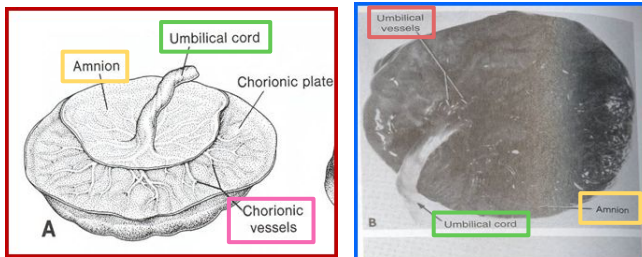
Full Term Placenta



- Discoid in shape.
- Weighs (500 – 600)g
- Diameter 15-25 cm
- Thickness 2-3 cm
- Has two surfaces: **Fetal**, **Maternal**
- Umbilical cord is attached to the center

Fetal Surface

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



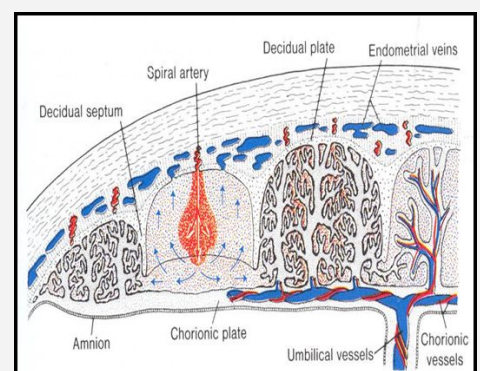
Maternal surface

- **Rough**
- Derived from endometrium
- 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.

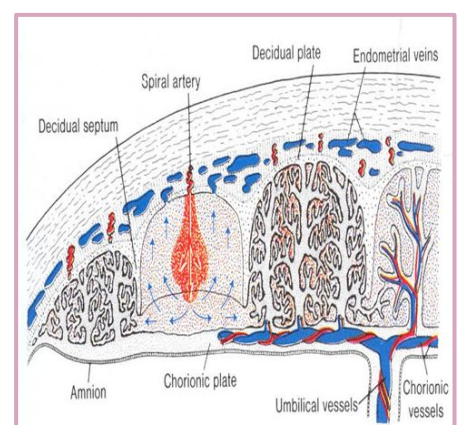
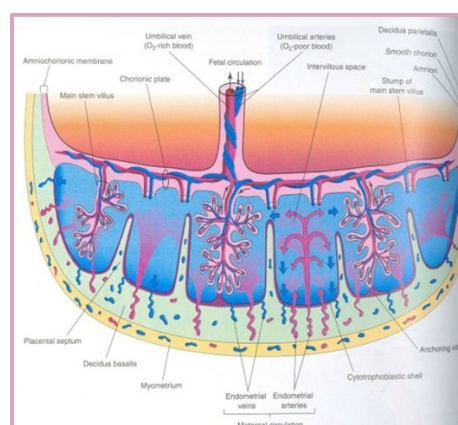
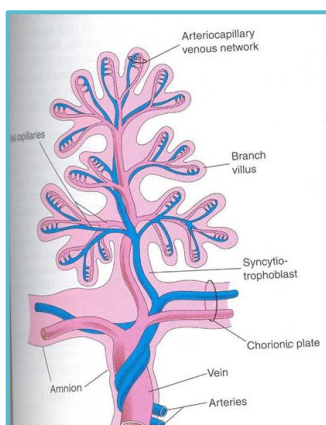
Fetal Placental Circulation

- **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.**

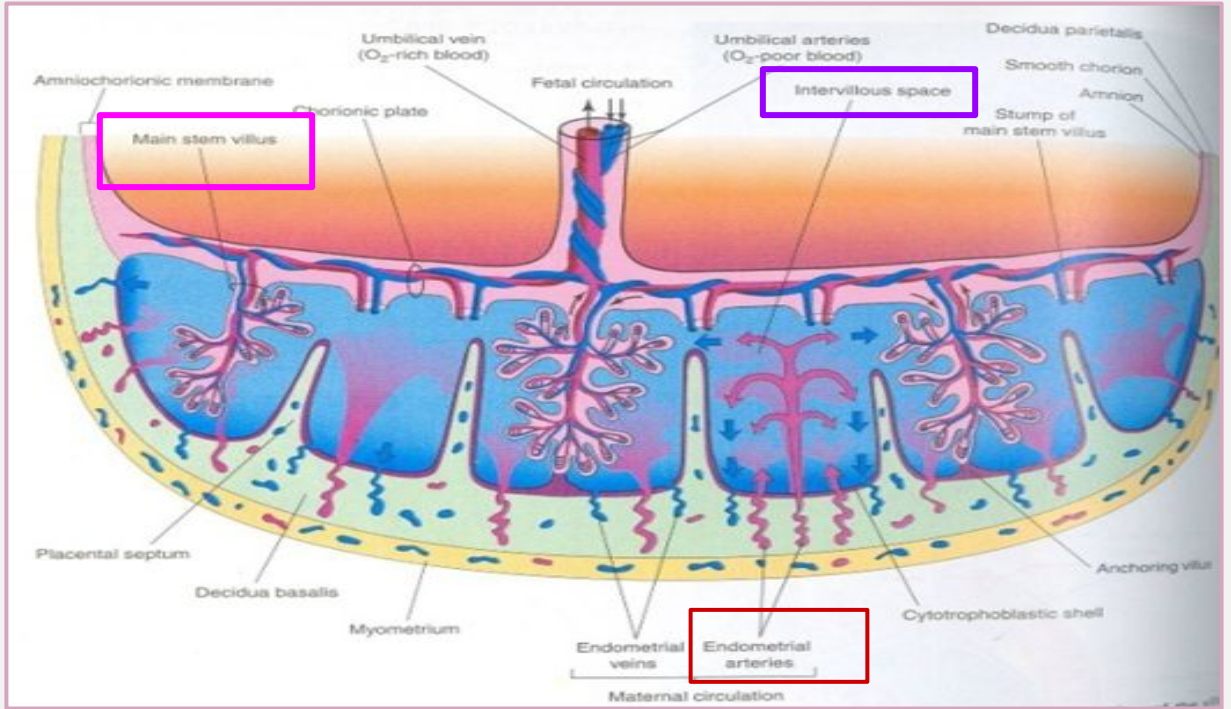
See next slide for better understanding

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.



Explanation



الكوتيلييدون هي عبارة عن ارتفاعات زرع الجبال، هذي الجبال يدخل جواتها معبر للبلود فزلس نسيمه (ستيم فيلاي) .. داخل هذه السيمت فلاي بيدخل الامبلايكل بلود فزلس من الجنين .

من بين كل فلاي وفلاي فيه مسافه نسيمها انترفلس سبيس، هذي المسافة تستقبل السبايرل ارتري الي جاي اندومتريم الأم الي منه راح يحصل الجنين على الغذاء وبعد كذا يرجع على شكل فين

Maternal placental circulation:

الجنين الغزات بتنتقل من الأم إلى الجنين بسبب الإختلاف في الضغط، من العالي (الأم) إلى المنخفض (.. ومين يعلي ضغط الأم ؟ جزيئات الأوكسجين

Fetal placental circulation:

الفلاي تحتوي على الأمبلايكل فزلس، والأمبلايكل فزلس هي الفين والأرتري وكابلري . الأرتري بيكون جاي وجايب معها الدم الغير مؤكسج من الجنين وبيتحول بعد كذا لكابلري علشان تحدث عملية تبادل الغازات، تطلع غزات الجنين وتروح للأم وتجي غزات الأم للجنين من السبايرل ارتري (الي صب في الأنترفلس سبيس) وبعد كذا تتحول الكابلري إلى فين يحمل الأوكسجين ويوديه للجنين

Placental Membrane

Important

- 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.

❖ **At full term:**

- It becomes thinner and composed of **(3) layers** only:

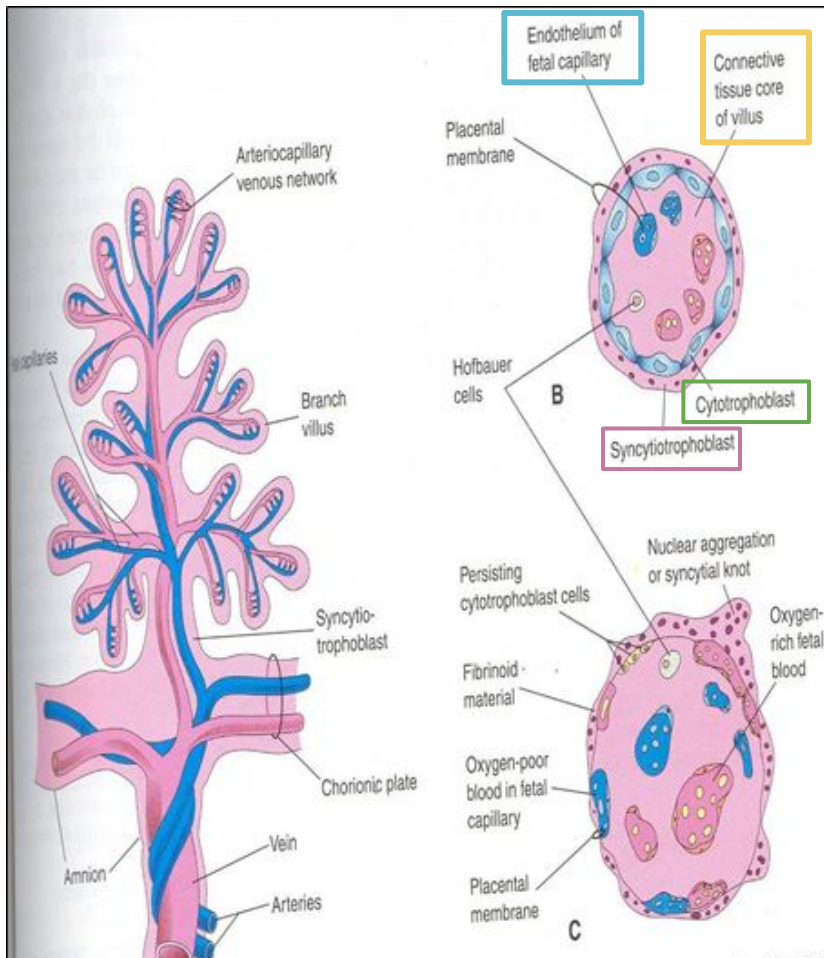
هنا الجنين كبير فيحتاج انتقال أسرع للغازات والغذاء علشان كذا بيتخلص من وحدة من الطبقات الأربعة

Syncytiotrophoblast

Connective tissue of the villus.

Endothelium of fetal 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

Metabolic	<ul style="list-style-type: none"> - Synthesis of: Glycogen, Cholesterol and Fatty Acids - They supply the fetus with nutrients and energy. 	
Transportation of	Gases	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Water, Amino acids, Carbohydrates, Vitamins and Free Fatty Acids are rapidly transferred to the fetus.
Maternal Antibodies	<p>Maternal immunoglobulin G gives the fetus passive immunity to some infectious diseases (measles, small box) and not to others (chicken box).</p>	
Drugs and Drug metabolites	<ul style="list-style-type: none"> - They cross the placenta by simple diffusion. - They can affect the fetus directly or indirectly by interfering with placental metabolism. 	
Hormones	<ul style="list-style-type: none"> - 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	<p>Urea and uric acid pass through the placental membrane by simple diffusion.</p>	
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	<ul style="list-style-type: none"> -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	<p>Maintains the corpus luteum and used as indicator of pregnancy</p>	

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

1. Placenta Accreta

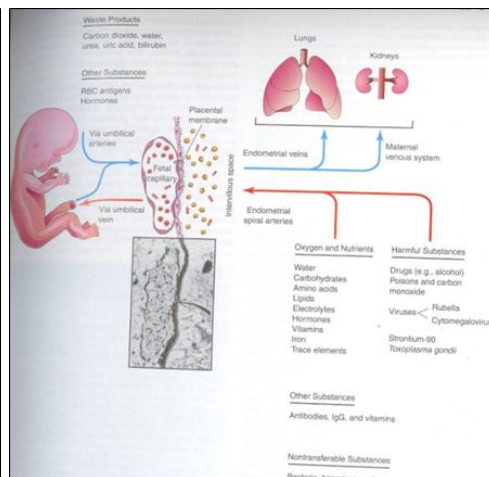
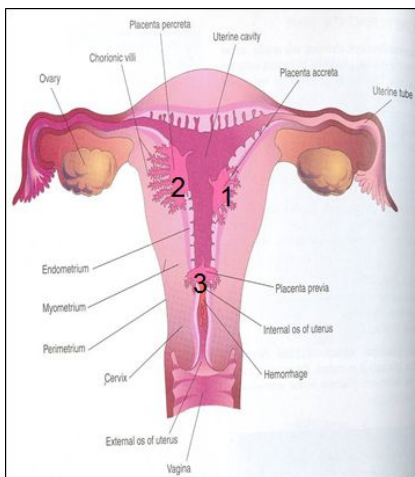
Abnormal absence of chorionic villi with partial or complete absence of the decidua basalis.

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

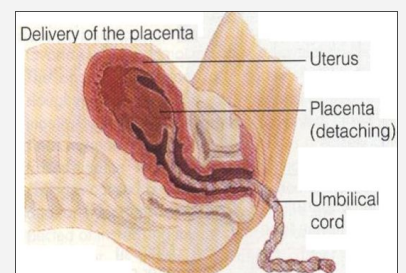
- **The blastocyst is implanted close to or overlying the internal uterine os.**
- It is associated with late pregnancy bleeding
- Delivery is through **Cesarean section**.



□ for slide 7

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).



Summary

Placenta	the beginning of the 4th month	Villous Chorion (Fetal part)
		Decidua Basalis (Maternal part)
Placental Membrane	Up to 20 weeks.	Syncytiotrophoblast.
		Cytotrophoblast.
		Connective tissue of the villus.
		Endothelium of fetal capillaries.
	At full term	Syncytiotrophoblast
		Connective tissue
Endothelium of the capillaries		
Fate of Placenta	Detachment 15 minutes after birth	

MCQ's

1. What is the function of the 2 umbilical arteries?		2. Transportation of gases is through	
A.	Carry poorly oxygenated blood from the placenta to the fetus	A.	Simple diffusion
B.	Carry oxygenated blood from the fetus to the placenta	B.	Second transporters
C.	Carry oxygenated blood from the Placenta to the fetus	C.	ATP sensitive pumps
D.	Carry poorly oxygenated blood from the fetus to the placenta	D.	Active transport
3. Which of the following is associated with late pregnancy bleeding		4. Which of the following layers disappears in full term placenta	
A.	Placenta Accreta	A.	syncytiotrophoblast
B.	Placenta Percreta	B.	Endothelium of fetal capillaries
C.	Placenta Previa	C.	Cytotrophoblasts
D.	Normal pregnancy	D.	Connective tissue of the villi
5. Which part of decidua forms the maternal part of placenta?		6. Which ONE of the following is true about the maternal part of placenta	
A.	Marginalis	A.	Covered by amnion
B.	Basalis	B.	Contain cotyledons
C.	Capsularis	C.	Umbilical cord attached to its center
D.	Parietalis	D.	Umbilical vessels can be seen

Q	1	2	3	4	5	6
Answers	D	A	C	C	B	B