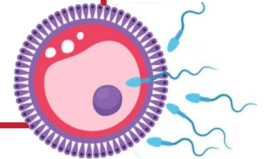


Placenta

Reproductive block-Embryology-Lecture 4


Editing file



Objectives

Color guide :
Only in boys slides in **Green**
Only in girls slides in **Purple**
important in **Red**
Notes in **Grey**

 **At the end of the lecture, students should be able to:**

- Identify nothing because there is no objectives in the Dr's lectures
- There is also nothing here but we want to fill the space
- It is worth noting that, this lecture was done while coronavirus pandemic 
- I would like to thank the batch and academic leaders for their hard working in these two years
- Free space for adding any things

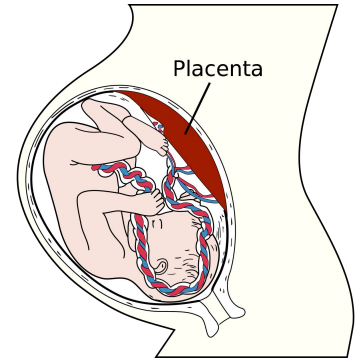


Placenta

Introduction

- It is a fetomaternal structure.
- Formed by the **beginning** of the **4th month**. and **by the end of the 4th month a complete vascular network in placenta is established** (after degenerate of corpus luteum)
- It is the primary site for exchange of gases and nutrients between mother and fetus
- Full term placenta shows: 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.

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.



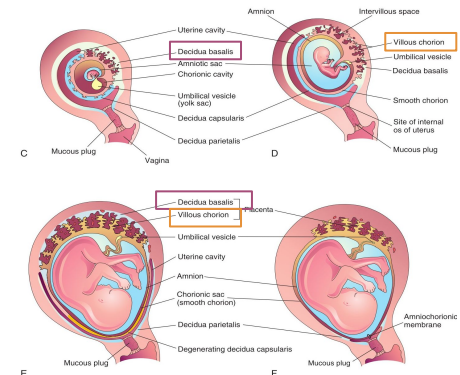
Formation

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** (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.



Placenta cont.

Placental externally

Fetal Surface

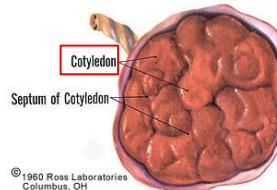
- Smooth because it is covered with the amnion.
- Developed from chorionic sac.
- The umbilical cord is attached to its center.
- The chorionic vessels are radiating from the umbilical cord.

Surfaces

FETAL SURFACE OF PLACENTA



MATERNAL SURFACE OF PLACENTA



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.

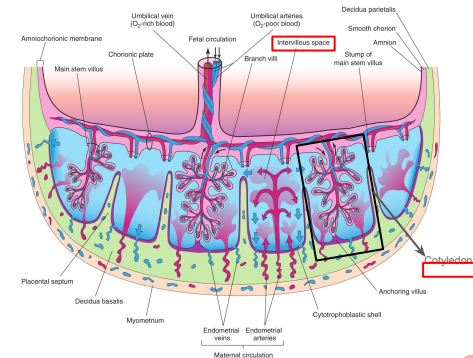
Placental internally

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.



Placental circulation

Fetal placental circulation

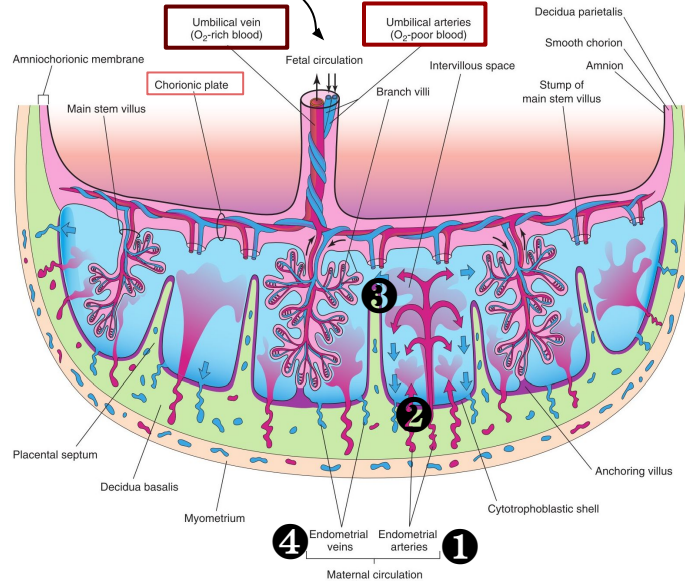
Two Umbilical Arteries:

- 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**.



1. 80–100 spiral endometrial arteries discharge into the intervillous space.
2. The blood is propelled in jet like fountains by the maternal blood pressure.
 - Now the pressure of this entering blood is higher than that in the intervillous space.
 - It forms a roof of the space.
3. As the pressure dissipates, the blood flows slowly around the branch villi.
 - Exchange of metabolites and gases with the fetal blood.
4. As the pressure decreases, the blood flows back from the chorionic plate and enter the endometrial veins to the maternal circulation.

Maternal placental circulation



Placental Membrane

- It is a composite thin membrane of extra fetal tissues which separates the fetal and maternal bloods.

Upto(20) weeks
it is composed of four layers:



At full term
it becomes thinner and composed of three layers only:

1 Syncytiotrophoblast

2 Cytotrophoblast.

3 Connective tissue of the villus

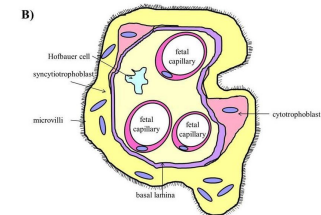
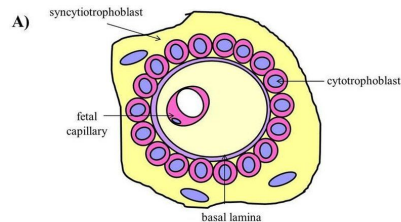
4 Endothelium of fetal capillaries

1 Syncytiotrophoblast

2 Connective tissue of the villus

3 Endothelium of fetal capillaries

At some sites, the syncytio comes in direct contact with the endothelium of the capillaries and forms **Vasculo syncytial placental** membrane.



Functions of placenta

Has there main function

1. Metabolic

Synthesis of:

- Glycogen
- Cholesterol
- Fatty Acids which 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

C) Maternal Antibodies: Maternal immunoglobulin G gives the fetus passive immunity to some infectious diseases (measles, small pox) and not to others (chicken pox).

E) Waste products: Urea and uric acid pass through the placental membrane by simple diffusion.

B) Drugs and Drug metabolites:

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

D) 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) Nutrients and Electrolytes: Water, Amino acids, Carbohydrates, Vitamins and Free Fatty Acids are rapidly transferred to the fetus.

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) Human chorionic somatomammotropin (HCS) or Hpl: A growth hormone that gives the fetus the priority on maternal blood glucose. It promotes breast development for milk production

(4) Human chorionic gonadotropin (HCG): Maintains the corpus luteum and used as indicator of pregnancy.



Anomalies Of Placenta

Placenta Accreta

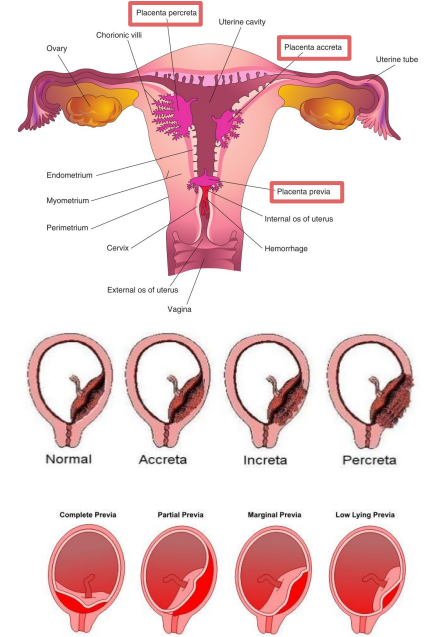
- Abnormal absence of chorionic villi with partial or complete absence of the decidua basalis.

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.



Effect Of Maternal Drugs On Fetus

- 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

QUIZ

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
C	C	B	A	B	D	B	B

Q1: Which of the following layers mostly disappears in full term placenta

- A. syncytiotrophoblast
- B. Endothelium of fetal capillaries
- C. Cytotrophoblasts
- D. Connective tissue of the villi

Q2: Which of the following Anomalies is associated with late pregnancy bleeding

- A. Placenta Accreta
- B. Placenta Percreta
- C. Placenta Previa
- D. Placenta increta

Q3: fetal surface of placenta Derived from.....

- A. endometrium
- B. chorionic sac
- C. Yolk sac
- D. Connective tissue of the villus

Q4: placenta can synthesis

- A. Glycogen
- B. Collagen
- C. amino acid
- D. protein

Q5: which of these hormone Maintains the corpus luteum

- A. hCS
- B. hCG
- C. Progesterone
- D. Estrogen

Q6: The most common presenting sign of Placenta Percreta

- A. anal bleeding
- B. pain in the abdomen
- C. blood in urine
- D. trimester bleeding

Q7: the Umbilical Arteries carry

- A. deoxygenated blood
- B. poorly oxygenated blood
- C. highly oxygenated blood
- D. mixed blood

Q8: Each Cotyledon contains

- A. one or more stem vill
- B. two or more stem vill
- C. only two stem vill
- D. at least three stem vill



Members board



Team leaders

- **Abdulrahman Shadid**

Boys team:

- Mohammed Al-huqbani
-  Salman Alagla
- Ziyad Al-jofan
- Ali Aldawood
- Khalid Nagshabandi
-  Sameh nuser
- Abdullah Basamh
- Alwaleed Alsaleh
- Mohaned Makkawi
- Abdullah Alghamdi

- **Ateen Almutairi**

Girls team :

- Ajeed Al Rashoud
- Taif Alotaibi
- Noura Al Turki
- Amirah Al-Zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Renad Al Haqbani
- Nouf Al Humaidhi
- Jude Al Khalifah
- Nouf Al Hussaini
- Danah Al Halees
- Rema Al Mutawa
- Maha Al Nahdi
- Razan Al zohaifi
- Ghalia Alnufaei

Contact us:

