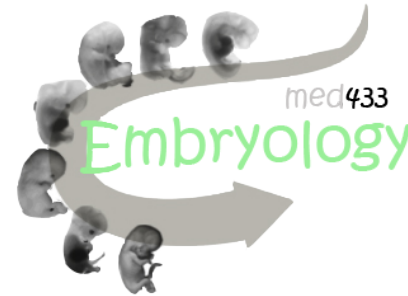


# EMBRYOLOGY

# PLACENTA



Mind Map

## PLACENTA

It is a Fetomaternal structure. Formed by the beginning of the 4<sup>th</sup> month.

- **Formation of Placenta**
  - **Fetal Part:** Villous Chorion.
  - **Maternal Part:** Decidua Basalis Decidua? (Gravid Endometrium)
- **FULL TERM PLACENTA**
  - Weighs (500 – 600)g. Has two surfaces:
  - **Fetal** → Smooth, . The umbilical cord , chorionic vessels
  - **Maternal** → Rough, Cotyledons, placental septa, decidua basalis
- **Fetal Placental Circulation** → **Two** Umbilical Arteries and **One** Umbilical Vein
- **Maternal Placental Circulation** → **80 –100** spiral endometrial arteries and endometrial veins
- **PLACENTAL MEMBRANE**
  - **Up to (20) weeks**, it is composed of **(4) layers**
  - **At full term** it becomes thinner and composed of **(3) layers**
- **FUNCTIONS OF THE PLACENTA**      1. Metabolic      2. Transportation
- **FATE OF PLACENTA** → within **15 minutes** after birth of the infant

# PLACENTA

## What is it ?

It is a Fetomaternal structure \*Part from the fetus and part from the mother\*

## When it is formed ?

Formed by the beginning of the 4<sup>th</sup> month.

## What is the function of it ?

It is the primary site for exchange of gases and nutrients between the mother and the fetus.

## #FORMATION OF PLACENTA

Fetal part

### • Villous Chorion

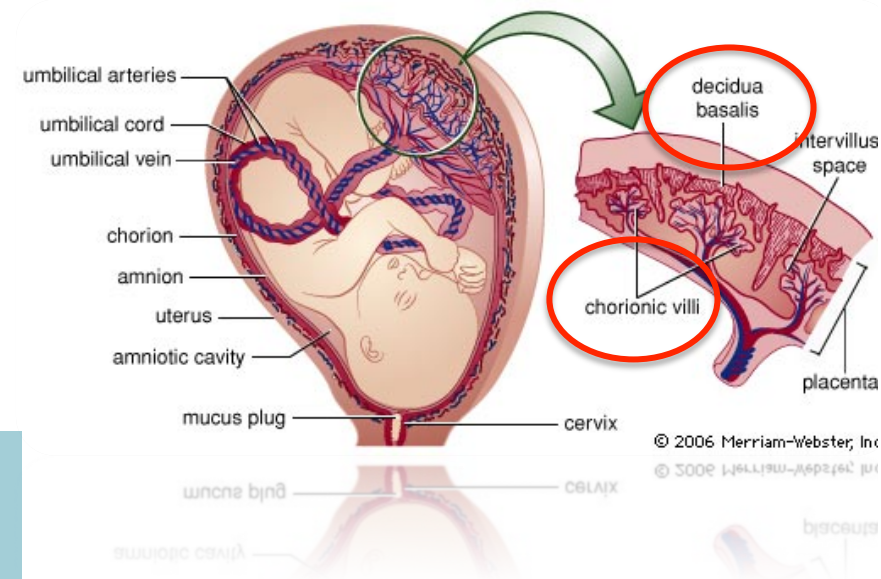
- It is the bushy area at the embryonic pole
- Its villi are more in number, enlarged and branch profusely.

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 and Maternal.

## #CRITERIA OF FETAL AND MATERNAL SURFACES :

### surface Fetal

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

1. Rough.
2. 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

MATERNAL SURFACE OF PLACENTA

FETAL SURFACE OF PLACENTA



## #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.

What is intervillous space?

## #INTERVILLOUS SPACES:

\*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.

## #FETAL PLACENTAL CIRCULATION / MATERNAL 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.**

### Maternal Placental Circulation

\*80 –100 **spiral endometrial arteries** discharge into the intervillous spaces.

\*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**

\*will disappear later\*

**Endothelium of fetal capillaries.**

**Connective tissue of the villus.**

At full term, it becomes thinner and composed of (3) layers only:

**Syncytiotrophoblast**

**Endothelium of fetal capillaries.**

**Connective tissue of the villus.**

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	Transportation	Endocrine Synthesis
<p>*Synthesis of: <b>Glycogen, Cholesterol and Fatty Acids.</b></p> <p>*They supply the fetus with nutrients and energy</p>	<p><b>(A) Gases:</b> *Exchange of O<sub>2</sub>, CO<sub>2</sub> and CO through simple diffusion. *The fetus extracts (20 –30) ml of O<sub>2</sub>/minute from the maternal blood.</p> <p><b>(B) Nutrients and Electrolytes:</b> Water, Amino acids, Carbohydrates, Vitamins and Free Fatty Acids are rapidly transferred to the fetus.</p> <p><b>C. Maternal Antibodies:</b> Maternal immunoglobulin G gives the fetus passive immunity to some infectious diseases (measles, small box) and not to others (chicken box).</p> <p><b>(D) Drugs and Drug metabolites*:</b> *They cross the placenta by simple diffusion. *They can affect the fetus directly or indirectly by interfering with placental metabolism</p> <p><b>(E) Hormones:</b> *Protein hormones do not reach the embryo in sufficient amounts. *some of these hormones: (Thyroxine &amp; Testosterone which may cause masculinization of a female fetus) can cross the placental membrane</p> <p><b>F) Waste products:</b> Urea and uric acid pass through the placental membrane by simple diffusion.</p>	<p><b>(1) Progesterone :</b> Maintains pregnancy if the corpus luteum is not functioning well.</p> <p><b>(2) Estrogen</b> Stimulates uterine growth and development of the mammary glands.</p> <p><b>3) hCS or Hpl:</b> *A growth hormone that gives the fetus the priority on maternal blood glucose. *It promotes breast development for milk production.</p> <p><b>(4) hCG:</b> Maintains the corpus luteum and used as <b>indicator of pregnancy.</b></p>

- \*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:

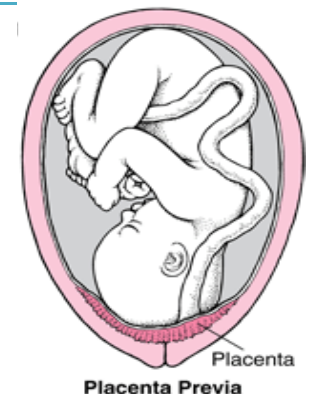
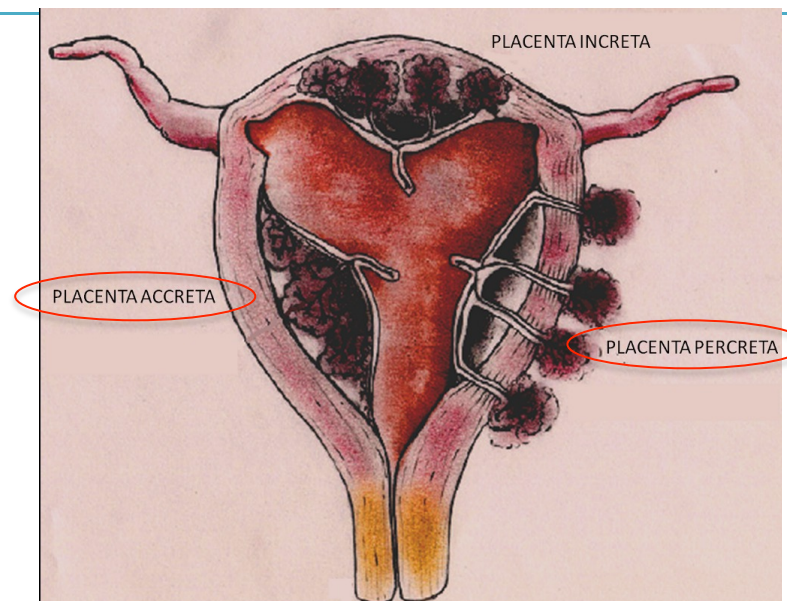
- \*Chorionic villi penetrate the myometrium to the perimetrium.
- \*The most common presenting sign of these two anomalies is trimester bleeding.

## 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**).



# Summary

- \*The placenta is a **Fetomaternal** structure formed by the beginning of the 4<sup>th</sup> month.
- \*It has two surfaces: **a smooth fetal surface and a rough maternal surface**.
- \***The umbilical cord is attached to the center of the fetal part.**
- \*The placenta is formed of 15-20 Cotyledons.
- \*The umbilical cord contains **two umbilical arteries** carrying deoxygenated blood and **one umbilical vein** carrying the oxygenated blood.
- \***Functions of the placenta are to supply the fetus with nutrients and energy, gases exchange and maternal antibodies (IgG).**
- \*Placental anomalies are: Placenta Accreta, Placenta Percreta and Placenta Previa.

## Quiz yourself

Q1:the placenta will detach from the uterine wall within..... after birth of the infant:

- A.15 h
- B.15 sec
- C.15 minutes

Q2: Up to (20) weeks, it is composed of (3) layers only

- A.True
- B.False

Q3: Criteria of Maternal Surface are

- A.Rough
- B.The umbilical cord
- C.decidua basalis.
- D.a&c

Q1:Contribute to the formation of Placenta:

- A.Villous Chorion.
- B.Decidua Basalis
- C.Both A&B
- D.Villous Basalis

Ans;

1.C

2.B

3.D

4.C



# Good Luck

Done By

Rawan Alotaibi

Amani Alotaibi

Barah alqarni

Noura alnajashi

