

**Definition:** - Placenta refers to any region in a viviparous organism where maternal and embryonic tissues of any kind are closely apposed, and which serves as a site for physiological exchanges between parent and embryo.

There are two basic types of placenta

- (1) Chorion - Vitelline Placenta.
- (2) Chorion - allantoic placenta.

**(1) Chorion - Vitelline placenta :-**

\* Present in most of Marsupials. eg. *Macropus*.

(chorion + vitelline membrane (yolk sac))

\* It also occurs as a temporary structure in many eutherians also.

example: insectivores, rodents and horse.

\* Such placenta may begin its development with only one cell layer, the trophoectoderm (which forms chorion) enclosing the blastocoel. → This is **chorionic placenta**.

\* Later it becomes bilaminar due to the blastocoel acquiring the endodermal lining. Now, it is called yolk sac placenta.

\* Still later, in many species, it becomes trilaminar, due to invasion of extra-embryonic mesoderm and its vascular supply between the trophoectoderm and the endoderm. At this stage, it is called **Chorion - vitelline placenta**.

\* In such placenta, <sup>(1)</sup>allantois remains relatively small and never makes contact with chorion.

(2) Yolk sac becomes very large and gets fused broadly with the chorion.

**(2) Chorion - Allantoic or Allantoic placenta :-**

eg. *Paramyles*, *Dasurus*

\* In all the marsupials, yolk sac become rudimentary and ~~yolk sac~~ <sup>allantoin</sup> becomes well developed and vascularized to become fused with chorion and to furnish the blood supply to latter. Such a foetal placenta is called Chorio-allantoic placenta.

\* Chorion is not smooth but bears root like vascular-processes, the villi which grow out from the chorion into the adjacent maternal tissue.

# 3 major classification.

(I) MORPHOLOGICAL CLASSIFICATION OF PLACENTA :-

On the degree of intimacy of foetal and maternal tissues, following three types of placentae are found.

- (1) Non-deciduous placenta/semiplacenta.
- (2) Deciduous placenta/placenta vera.
- (3) Contra-deciduate placenta.

~~(1) Non-deciduous placenta (Semiplacenta) :-~~

(II) CLASSIFICATION OF PLACENTA ACCORDING TO DISTRIBUTION

OF VILLI ON CHORION.

- (1) Diffuse placenta.
- (2) Cotyledonary placenta.
- (3) Zonary placenta.
- (4) Discoidal placenta.
- (5) Metadiscoidal placenta.

(III) HISTOLOGICAL TYPES OF PLACENTA.

- (1) Epithelio-chorial placenta.
- (2) Syndesmo-chorial placenta.
- (3) Endothelio-chorial placenta.
- (4) Haemo-chorial placenta.
- (5) Haemo-endothelial placenta.

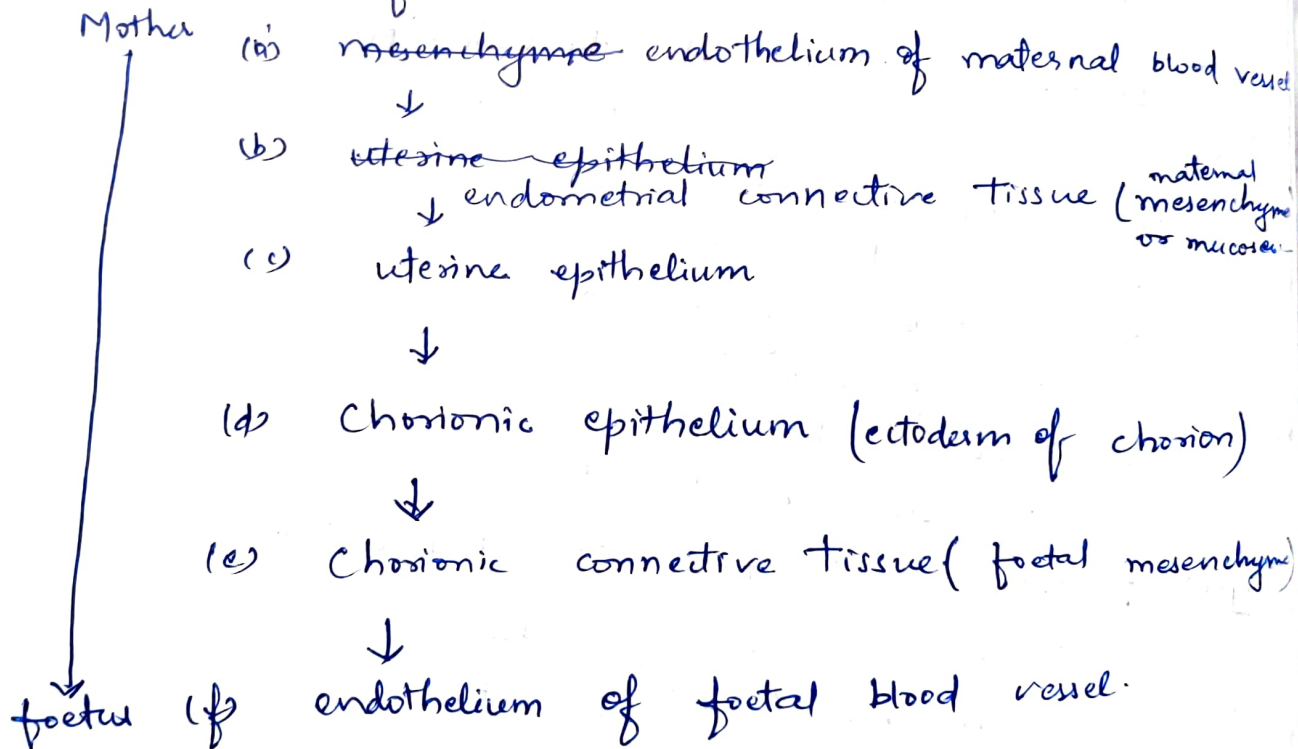
## HISTOLOGICAL TYPES OF PLACENTA

On histological basis, following types of mammalian placentae have been found:-

- (1) Epithelio-chorial placenta.
- (2) Syndesmo-chorial placenta.
- (3) Endothelio-chorial placenta.
- (4) Haemo-chorial placenta.
- (5) Haemo-endothelial placenta.

(1) Epithelio-chorial placenta: (6) Marsupials, Ungulates  
- Most primitive type of placenta. (Pig, horse, saw, cattle etc.) Lemur.  
- Six membranes lies in between maternal and foetal tissues. Molecules of nutrients and oxygen passes through all six barriers.

- The order of membrane is



- Since, immediate contact of two halves of placenta involve chorionic epithelium and uterine epithelium, this type of placenta is called epithelio-chorial placenta.



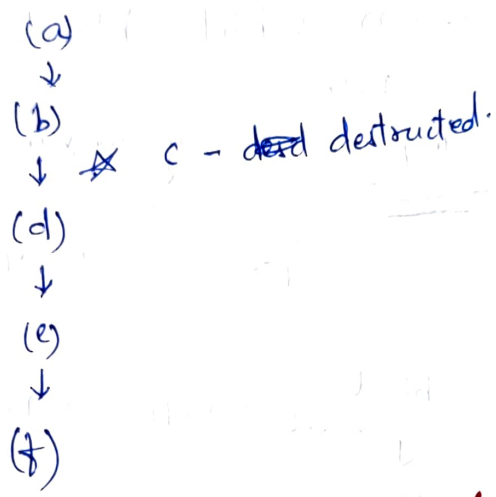
- Villi of such placenta push into wall of uterus and later lie in the pocket-like depressions of the uterine wall.

(2) Syndesmo-chorial placenta: (5 <sup>placental</sup> maternal barriers)

e.g. Ruminating ungulates (cattle, sheep).

- Foetal and maternal components are fused so intimately that uterine epithelium is destroyed resulting in direct contact of chorion with uterine mucosa layer.

- Only five barriers.

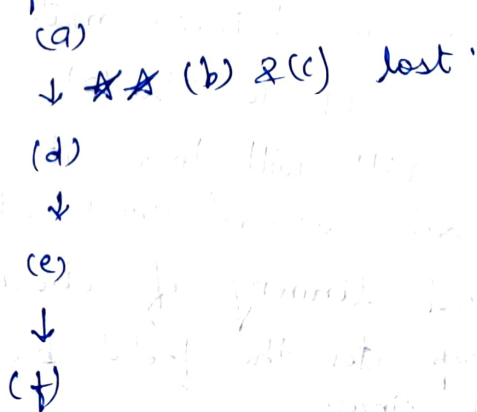


(3) Endothelio-chorial placenta: - (Four <sup>placental</sup> maternal barriers)

e.g. Carnivores (dog, cat, bear etc.)

- In addition to uterine epithelium (c), uterine mucosa (b) is reduced and the chorionic epithelium comes in direct contact with endothelial wall of maternal blood vessels.

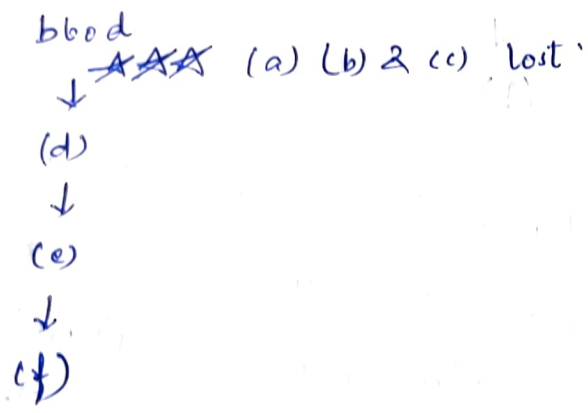
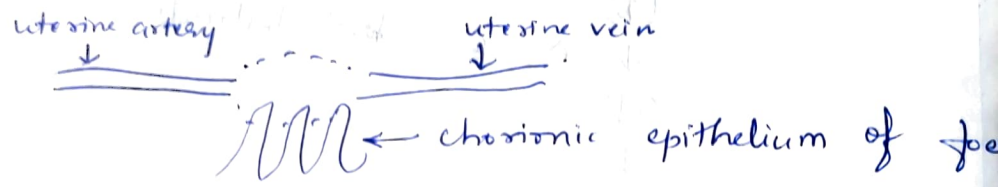
- Only four barriers.



(4) Haemo-chorial placenta: (Three placental barriers)

eg. Primates, Insectivores (moles, shrews), chiroptera (bat).

- Endothelial wall of maternal blood vessel (a) disappear and the chorionic epithelium is directly in maternal blood.
- Chorionic villi are surrounded by sinuses devoid of endothelial lining into which blood enters through the arteries of the placenta and from which blood flows into the uterine vein.



(5) Haemo-endothelial placenta: (Two placental barriers)

eg. mouse, rat, guinea pig, rabbit.

- No. of barrier between maternal and foetal stream reduced to two (2).
- Chorionic villi will lose its epithelial and mesenchymal layer. (almost lost). (d & e lost)
- Endothelial lining of chorionic villi alone separates the foetal blood from maternal sinuses.