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Topic: Placentation

Placentation

- Placenta (Gr. Placenta, flat cake) is the special structure through which the exchange of materials between foetal and maternal circulation occurs.
- Phenomenon of placentation is invariable related to viviparity.
- Placenta is universally present in eutherian mammals.
- As a result of metabolism in the body of a mammalian embryo, wastes are eliminated through mother's body via placenta.
- Placenta is the region where foetus receives nourishment from mother's blood.
- Role of placenta is to provide essential requirements for growth of embryo.
- By the presence of placenta, the mammalian embryo has a parasitic mode of nutrition. Foetus is like a parasite of mother, depending on it for nourishment.
- Placenta connects the embryo with the uterine wall.
- Placenta is formed by interlocking of both foetal as well as maternal tissues. The part derived from foetus is called foetal placenta while that derived from uterine wall is called maternal placenta.

- Placenta contains minute finger – like projections called villi. The uterine wall form corresponding depressions called crypts.

Classification of Placenta:

Three main factors involved in the classification of mammalian placenta are;

1. Nature of extraembryonic membranes involved.
2. Distribution of villi and shape of placenta.
3. Histological types.

Nature of Extraembryonic Membranes

1. **Yolk sac placenta:** Placenta is derived from yolk sac and chorion, e.g., Metatheria (kangaroo and Opossum).
2. **Allantoic placenta :** Placenta is formed from allantois and chorion, e.g., Eutherian mammals (Rabbit). The umbilical cord contains allantoic artery and vein.
3. **Chorionic placenta:** Placenta is formed only by chorion, allantois remains small and does not reach chorion, e.g., Apes and Man.

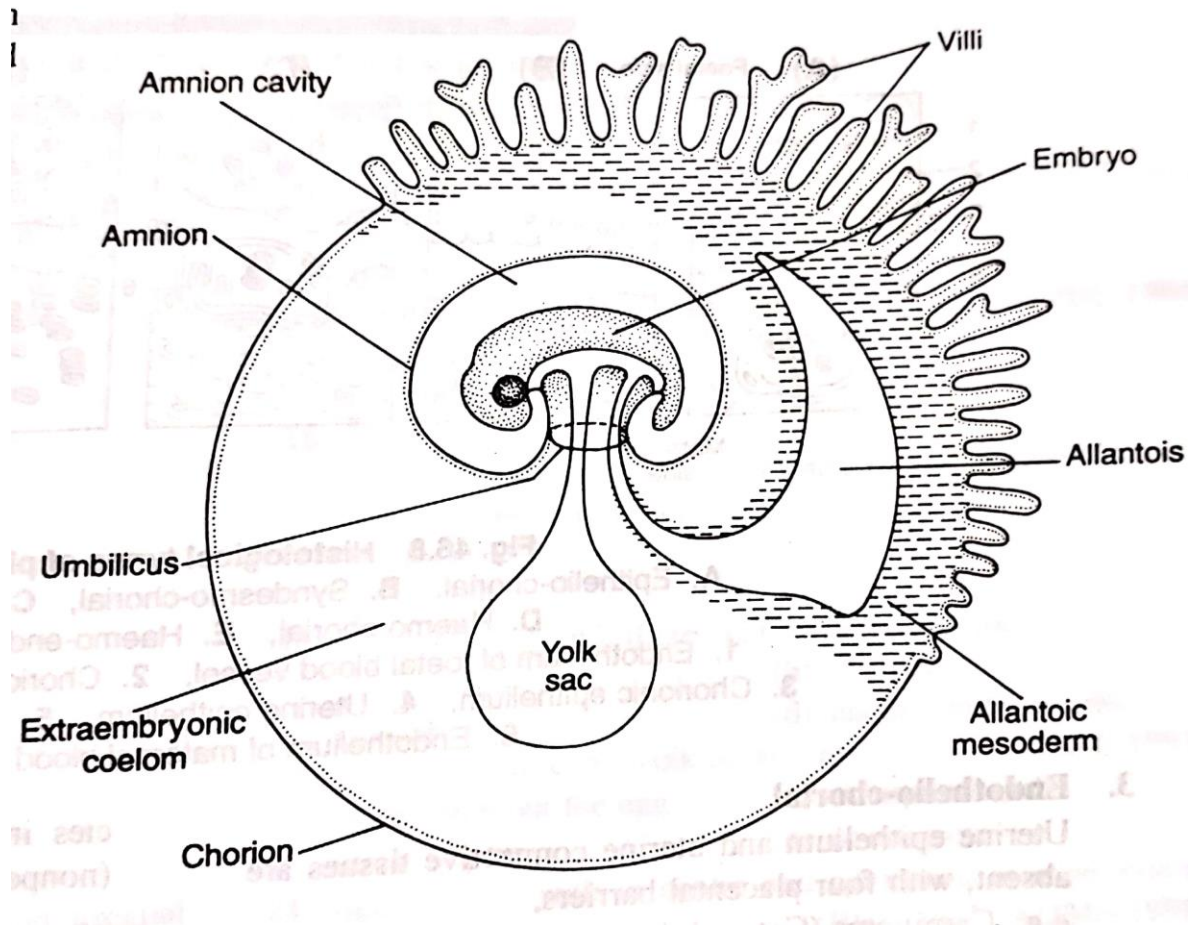


Fig. Extra embryonic membranes in a mammal.

Distribution of villi and shape of Placenta

1. **Diffuse:** Villi remain scattered, e.g., Pig.
2. **Cotyledonary:** Villi arrange in separate tufts or patches called cotyledons, e.g., Sheep and Cow.
3. **Zonary:** Villi form a girdle encircling the blastocyst, e.g., Carnivore mammals (cat and Dog).
4. **Monodiscoidal:** Villi restricted to a circular disc, e.g., Rabbit, Apes and Man.
5. **Bidiscoidal:** Villi restricted to two discs, e.g., Monkeys.

Histological types

Six tissue barriers in placenta are:

1. Chorionic epithelium,
2. Chorionic connective tissue,
3. Endothelium of foetal blood vessels,
4. Uterine epithelium,
5. Uterine connective tissue and
6. Endothelium of maternal blood vessels.

Five histological types of placenta are -

1. **Epithelio-chorial:** Simplest type with all six placental barriers ,e.g., Pig.
2. **Syndesmo-chorial:** Uterine epithelium absent, with five placental barriers, e.g., cattle and sheep.
3. **Endothelio-chorial:** Uterine epithelium and uterine connective tissues are absent, with four placental barriers, e.g., carnivores (cat and dog).
4. **Haemochorial:** Uterine epithelium, uterine connective tissue and endothelium of maternal blood vessels absent, e.g., man ,Apes and Monkeys.
5. **Haemo-endothelial:** Foetal capillaries in direct contact with maternal blood, only one placental barrier, e.g., Rat and Rabbit.

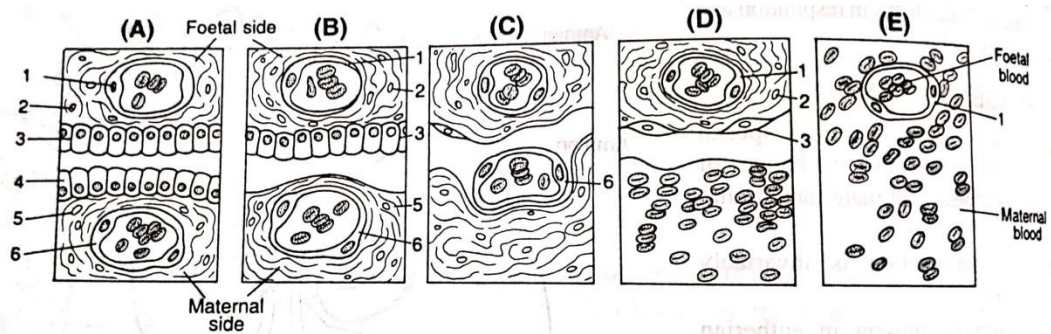


Fig. Histological types of placenta

A. Epithelio-chorial, B. Syndesmo-chorial, C. Endothelio-chorial,

D. Haemo-chorial, E. Haemo-endothelial,

1. Endothelium of foetal blood vessel, 2. Chorionic connective tissue,

3. Chorionic epithelium, 4. Uterine epithelium, 5. Uterine connective tissue,

6. Endothelium of maternal blood vessel

Placenta and diseases:

- Viral and bacterial infections of placenta are known as placentitis.
- If the mother suffers from certain diseases like syphilis, smallpox, chickenpox and measles; their pathogens enter foetus through placenta.
- Many drugs used medicinally may penetrate the placental barriers.