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Development of Human Placenta: →

The egg is fertilized if sperm are present, near the opening of the oviducal tube. Cleavage takes place in uterus. In uterus, it spends about a week free or loosely attached to the uterine wall. During this time it becomes a blastocyst and loses the zona pellucida. About the 9th and 10th days it is implanted in the uterine wall, which is now ready to receive it.

At this time, the polar cells undergo rapid proliferation, producing an outer syncytial layer, the trophoblast and an inner cellular layer, the cytotrophoblast. The syncytial layer actively erodes the surrounding maternal tissue, thus embedding the embryo more deeply and producing a liquid cellular debris called embryotroph, which serves as food for the embryo. The attachment of the embryo is further aided by proliferative activity on the part of the adjacent uterine mucosa, which grows over the implanting ovum in the so called decidual reaction. Soon thereafter, projections grow out from the cytotrophoblast of the chorion to become villi. Through erosive action on the uterine blood vessels the villi are bathed in maternal blood, which is brought into the intervillous spaces and carried away by the uterine capillaries. Only those villi which are in contact with the decidua basalis persist, the other degenerate.

two areas, the chorion frondosum, which is provided with villi and the chorion laeve, which is devoid of them.

The placenta is non-allantoic. It will be recalled that the embryonic knob retains its connection with the trophoblast as the body stalk. Into the body stalk grows the small evagination from the hind gut which represents the endodermal lining of the allantois. It never comes in contact with the trophoblast and soon degenerates. The limiting sulci of the amnion approach each other and the amnion closes in around the body stalk and its associated structures to form the umbilical cord. The latter contains the body stalk, yolk stalk, allantoic stalk, as well as the umbilical arteries and umbilical veins which grow out from the body of the embryo towards the trophoblast. These umbilical blood vessels represent the allantoic vessels of all other amniotes.

"Efficiency of the placenta" →

It would seem from the histology that the placenta varies greatly in efficiency as an organ of interchange and there is some evidence to it. The closeness of foetal and maternal circulation is found to be approximately co-related with

- ① The size of the molecules that can cross the barrier.

- ② The rate of diffusion of ions.
- ③ The presence of a large allantois.
- ④ The amount of the histotrophe secreted.

-ted by the uterine glands.

⑤ The richness of the colostrum, the secretion of the mammary glands immediately after birth before the flow of milk begins.

The so-called less efficient placentae may result in the production of very well developed and active young.

Nearly all the mammals that produce large and well developed young have placenta of the allegedly less efficient type, with a large allantois.

"Functions of Placenta": →

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- ① The maternal blood supplies food and O_2 to the foetus by diffusion through placenta.
- ② The foetal blood gives out waste urea and CO_2 into the maternal circulation.
- ③ The placenta exercises a selective influence on food of the foetus - it acts as a barrier to substances harmful to the foetus and permits only useful nourishment.
- ④ Placenta stores glycogen for foetus before its liver is formed.
- ⑤ It protects the delicate foetal tissues by preventing the direct entry of maternal blood which is under high pressure.
- ⑥ The placenta stimulates the ovaries to secrete hormones which maintain pregnancy and the placenta itself produces hormones which control proper

development of the foetus.
(1) The trophoblast breaks down and digests proteins before they enter the foetal circulation.

Conclusion: →

(Continuation of the Placenta)

It is equally difficult to correlate placental structure without knowledge of the affinities of the mammalian orders based on other evidence. Diffuse and epitheliochorial type of placentation is primitive but, it is found among the most specialized mammalian orders. The insectivores, shown both by their anatomy and geological history to be an ancient group, are said to have discoidal haemo-chorial placentation. A classification based on placentation would put the sloths among man's nearest relatives.

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For SN
Prasad.

It has been pointed out earlier that there is never any direct communication between the foetal and maternal blood streams. Several reasons have been put forward for this. Firstly the foetal blood vessels are delicate and would not be able to withstand the pressure of blood in the maternal arteries. Then in the maternal blood certain proteins specific to individuals are circulating. These if transferred to the embryo, might prove harmful. The placenta therefore acts as a barrier and selects only such materials as suit the embryo. The blood also carries sex hormones that control the development of the secondary sexual characters, if the maternal

blood streams were to become confluent with that of the embryo it is difficult to see how the secondary sexual characters of a male foetus and the mother could escape alteration.

